The Central Engine
of
Active Galactic Nuclei

Abstracts

16 - 21 October 2006

Xi'an China

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2 Detailed Program

2.1 Monday, October 16, 2006

8:00-8:50	Registration,poster set-up	
8:50-9:00	Opening remarks L. Ho/J.-M. Wang	

Black Holes (Chair: M. Ward)

9:00-9:35	S. Kaspi	Advances in reverberation mapping (invited)
9:35-10:10	B. Peterson	Masses of black holes in AGN (invited)
10:10-10:25	J. Greene	Local active black hole mass functions
10:25-10:40	Z. Q. Shen	High-resolution millimeter-VLBI study of Sgr A* - a super-massive black hole at the Galactic Center
10:40-10:55	*Coffee break and posters*	
10:55-11:10	X.-B. Wu	Weighing black holes in radio-loud AGNs
11:10-11:25	Ran Wang	The black hole fundamental plane from a uniform sample of radio and X-ray emitting broad-line AGNs
11:25-11:40	G. Pastorini	Black hole mass measurements with adaptive optic assisted 3D-spectroscopy
11:40-11:55	A. Marconi	The relation among black holes, their host galaxies and AGN activity
11:55-12:10	X. W. Cao	Growth of massive black holes during radiatively inefficient accretion phases
12:10-14:00	*Lunch Break*	

Accretion Disk (Chair: A. Laor)

14:00-14:35	O. Blaes	Accretion disks in AGNs (invited)
14:35-15:10	S. Mineshige	Super-critical accretion flows (invited)
15:10-15:45	F. Yuan	Accretion models for low-luminosity AGNs (invited)
15:45-16:00	M. Kishimoto	The near-IR shape of the big blue bump: under the hot dust emission
16:00-16:15	*Coffee break and posters*	
16:15-16:50	T. Yaqoob	Iron K line diagnostics in AGNs (invited)
16:50-17:25	T. J. Turner	Narrow Fe K-shell line emission from the inner accretion disk (invited)
17:25-17:40	C. Done	The origin of the soft X-ray excess in AGNs
17:40-18:15	G. Matt	X-ray emission and reprocessing in AGNs (invited)
18:15-18:30	B. F. Liu	Disk corona in AGN: What do we expect?

2.2 Tuesday, October 17, 2006

Jets (Chair: O. Blaes)

9:00-9:35	P. Uttley	AGN X-ray variability: origin and implications for “grand unification" (invited)
9:35-10:10	S. Wagner	High-energy gamma-ray studies of AGNs (invited)
10:10-10:45	M. Boettcher	Broad-band spectral properties of blazars (invited)
10:45-11:00	*Coffee break and posters*	
11:00-11:15	D. Saikia	Episodic activity in radio galaxies
11:15-11:30	L. Maraschi	Jet properties at different scales
11:30-12:05	J.-M. Wang	Jet-disk connection in active galactic nuclei (invited)
12:05-12:20	P. Zycki	On the role of relativistic effects in the X-ray variability of AGN
12:20-14:00	*Lunch Break*	

Winds, Outflows (Chair: F. Hamann)

14:00-14:35	D. Proga	Theory of winds in AGNs (invited)
14:35-15:10	D. Chelouche	Flow physics as revealed by observations (invited)
15:10-15:25	J. C. Lee	The multiwavelength view of the QSO IRAS 13349+2438
15:25-15:40	T. Misawa	Probing quasar outflows with intrinsic narrow absorption lines
15:40-15:55	F. Nicastro	The powerful diagnostics of time-evolving photoionization for AGN ionized absorbers
15:55-16:10	*Coffee break and posters*	
16:10-16:45	S. Gallagher	Integrating X-ray and infrared views of BAL Quasars (invited)
16:45-17:00	E. Liang	Particle acceleration and radiation in electromagnetic jets and collisionless shocks
17:00-17:15	M. Brotherton	Busting myths about BAL quasars
17:15-17:50	D. M. Crenshaw	Mass outflows from Seyfert galaxies as seen in emission and absorption (invited)
17:50-18:05	M. Ward	Diagnostics of outflows
18:05-18:20	T.-G. Wang	Dense outflow from the Type 2 QSO SDSS J132419.88+053704.7
18:20-18:35	P.Rodriguez Hidalgo	High velocity outflows in quasars

2.3 Thursday, October 19, 2006

BLR (Chair: B. Peterson)

9:00-9:35	J. Shields	Implications of the Baldwin effect and related correlations (invited)
9:35-10:10	D. Casebeer	A review of AGN broad-line region photoionization models (invited)
10:10-10:25	M. Joly	BLR: non-radiative heating in strong Fe II emitters
10:25-10:40	M. Bentz	Refining the radius-luminosity relationship for AGNs
10:40-10:55	*Coffee break and posters*	
10:55-11:30	A. Laor	Constraints on the properties of the BLR from low-luminosity AGNs (invited)
11:30-11:45	W. Kollatschny	Short-term line profile variations in selected AGNs
11:45-12:00	K. Lewis	Long-term profile variability in double-peaked emission-line AGNs
12:00-12:15	I. Strateva	Accretion disk balmer-line emission in AGNs
12:15-14:00	*Lunch Break*	

Torus (Chair: N. Levenson)

14:00-14:35	M. Elitzur	Unification issues and the AGN torus (invited)
14:35-15:10	E. Moran	Spectropolarimetry surveys of obscured AGN (invited)
15:10-15:25	P. Shastri	Different angles on active galaxies: where are we with regard to unification?
15:25-15:40	W. Jaffe	Infrared interferometric imaging of tori
15:40-15:55	R. Chary	Mid-infrared spectroscopy of Arp 102B: an ADAF and a torus?
15:55-16:10	*Coffee break and posters*	
16:10-16:45	R. Maiolino	X-ray absorption in AGNs (invited)
16:45-17:00	G. Risaliti	Time-resolved X-ray eclipse of NGC 1365: measuring the source size
17:00-17:15	M. Suganuma	Reverberation measurements of the inner radius of the dust torus in nearby Seyfert 1 galaxies
17:15-17:30	M. Guainazzi	Whereabouts of cold and hot gas in obscured AGNs
17:30-17:45	J. X. Wang	On the fraction of X-ray obscured quasars
17:45-18:00	Y. Terashima	Broad-band X-ray variability of AGNs with Suzaku
18:00-18:15	K. Cleary	Spitzer observations of powerful radio sources
18:15-18:30	D. V. Lal	The radio properties of Type 2 quasars

2.4 Friday, October 20, 2006

NLR (Chair: E. Moran)

9:00-9:35	B. Groves	The narrow-line region: current models and future questions (invited)
9:35-9:50	N. Bennert	Properties of the narrow-line region in active galaxies from spatially resolved spectroscopy
9:50-10:05	R. Morganti	Fast neutral outflows: a major source of feedback
10:05-10:20	D. Rupke	Spitzer observations of mid-infrared emission lines in LINERS
10:20-10:35	W. M. Yuan	Systematic study of a large sample of NLS1 galaxies from SDSS: first results
10:35-10:50	*Coffee break and posters*	
10:50-11:05	A. Constantin	The large-scale structure of LINERs and Seyferts and implications for their central engines
11:05-11:20	C. Li	The clustering of narrow-line AGNs in the local Universe
11:20-11:35	I. Marquez	X-ray nature of LINER nuclei
11:35-11:50	J. Holt	Emission-line outflows in compact radio sources - evidence for AGN-induced feedback
11:50-12:05	K. Inskip	Extended emission line regions: nature, origin
12:05-12:20	M. Schweitzer	Silicate emission in AGN - evidence for the torus?
12:20-14:00	*Lunch Break*	

Dust Grains (Chair: D. Proga)

14:00-14:35	A. Li	Dust in active galactic nuclei (invited)
14:35-15:10	E. Sturm	Infrared dust properties — a prime tool for AGN diagnostics (invited)
15:10-15:25	L. Hao	The mid-IR spectra of the SDSS AGNs
15:25-15:40	P. Ogle	Mid-IR spectra of quasars and radio galaxies
15:40-15:55	L. Binette	Dust and the far-UV break in quasar energy distributions
15:55-16:10	*Coffee break and posters*	
16:10-16:45	B. Czerny	Extinction curves in AGNs (invited)
16:45-17:00	M. Gaskell	The origin of wavelength-dependent continuum delays in AGNs - a new model
17:00-17:15	A. Prieto	The central parsec region of active galactic nuclei with Adaptive Optics
17:15-17:30	Z. H. Shang	UV to mid-IR SEDs of low-redshift quasars
17:30-17:45	M. Imanishi	Infrared 3-4 micron spectroscopic investigations of nuclear starbursts in Seyfert 1 and 2 galaxies
17:45-18:00	K. Kohno	Compact nuclear starburst in the central regions of Seyfert galaxies
18:30-21:30	*Conference Banquet*	

2.5 Saturday October 21, 2006

Stellar Processes (Chair: D. M. Crenshaw)

9:00-9:35	S. Nayakshin	Star formation in AGN accretion disks (invited)
9:35-10:05	N. Levenson	Observations of stellar processes in active galaxies (invited)
10:05-10:20	R. Davies	Eddington-limited starbursts in the central 10 pc of AGNs
10:20-10:35	M. Sarzi	The stellar populations in the central 10 pc of Seyfert 2 nuclei
10:35-10:50	*Coffee break and posters*	
10:50-11:25	F. Hamann	Quasars, SMBHs, and host galaxy evolution (invited)
11:25-11:40	N. Nagao	Metallicity evolution of active galactic nuclei
11:40-11:55	M. Malkan	Black hole mass/galaxy relations, near and far
11:55-12:10	Y.-M. Chen	Cosmological evolution of the duty cycle of quasars
12:10-14:00	*Lunch Break*	

Surveys and Future Missions (Chair: J.-M. Wang)

14:00-14:15	R. Becker	The radio properties of radio-quiet AGNs
14:15-14:30	S. Komossa	Radio-loud narrow-line Seyfert 1 galaxies
14:30-14:45	C. C. Cheung	Panchromatic views of large-scale quasar jets
14:45-15:00	A.Martinez-Sansigre	High-redshift obscured quasars
15:00-15:15	S. Gezari	Results from the search for tidal disruption flares in the GALEX Deep Imaging Survey
15:15-15:50	S. N. Zhang	The HXMT mission (invited)
15:50-16:05	*Coffee break and posters*	
16:05-16:20	J. Grindlay	Hard X-ray black hole surveys in space and time
16:20-16:35	A. Quirrenbach	AGN research with future interferometric arrays
16:35-16:50	R. Green	AGN science with the Large Synoptic Survey Telescope
16:50-17:05	Y.-H. Zhao	The LAMOST project

Conference Summary

17:05-17:40	H. Netzer	Theoretical issues (invited)
17:40-18:15	J. Shields	Observational issues (invited)

3 Invited Talks

4 Contributed Talks

5 Posters

6 Abstracts

The Optical Variability of Narrow Line Seyfert 1 Galaxies

Y.-L. Ai

Yunnan Observatory, CAS, China

We will present our results of a search for the presence of optical variability in a sample of 164 Narrow Line Seyfert 1 Galaxies. These objects are a subset of the 2000 Narrow Line Seyfert 1 Galaxies from the Sloan Digital Sky Survey(see astro-ph/0603759). We compare the photometric data between the SDSS DR4 and the DRSN1 to search for the variable objects.

The SMA CO(2-1) Observation towards Perseus A

Y.-P. Ao, J. Lim & D. V. Trung

Purple Mountain Observatory, CAS, China

We have observed the central 55 arcsec (about 20 kpc) of Perseus A in CO(2-1) with the SMA. Per A is the dominant cD galaxy at the center of the Perseus Cluster, which is one of the richest known clusters of galaxies and is believed to have a strong X-ray cooling flow. Previous observations have revealed copious molecular gas in Per A, as well as in a number of other cD galaxies at the centers of rich clusters believed to harbor strong X-ray cooling flows (Edge 2001; Salome & Combes 2003). The origin of the molecular gas in all these galaxies, however, is highly uncertain: the gas could have condensed from the cooling flow, stripped from close encounters with gas-rich galaxies, or acquired from mergers with gas-rich galaxies. Here, we provide the first compelling evidence that (a large portion of) the molecular gas in Per A indeed originated from its X-ray cooling flow, and hence that X-ray cooling flows in rich galaxy clusters can indeed deposit large quantities of molecular gas.

Balmer Absorption Lines in FeLoBALs

K. Aoki

Subaru Telescope, NAOJ, Japan

I will report that the discovery of non-stellar Balmer absorption lines in two FeLoBALs by near-infrared spectroscopy with CISCO attached with the Subaru 8.2-m telescope. Our discovery is the first non-stellar Balmer absorption lines among quasars.

Possible Gamma-ray Emission in 3C 345

J.-M. Bai, X.-H. Zhao, Y.-H. Zhang

Yunnan Astronomical Observatory, CAS, China

We argue that the dominant emission region of 3C 345 jet is outside broad line region. Thus, the soft photon filed in the emission region is mainly contributed by IR emission from dust torus. We model the spectra energy distribution of 3C 345 with the synchrotron process of relativistic electrons at low energies and the invserse-Comptom scattering off IR photon at high energies. Our calculations show that the gamma-ray emission of 3C 345 peaks at MeV energies with a steep spectrum at GeV energies and that the gamma-ray flux with photon energy over 30 MeV is smaller than EGRET sensitivity but greater than the GLAST sensitivity. The results can be tested by GLAST observations in the near future.

The Radio Properties of Radio-Quiet AGN

R. Becker

UC-Davis/LLNL, Physics Dept, Univ of Calif, USA

Large catalogs of AGN taken in combination with the FIRST survey allows us to probe radio emission from AGN twenty times fainter than the nominal flux density limit of FIRST. This is achieved by stacking the images of thousands of AGN to reach mean radio fluxes of tens of microJy. With AGN catalogs exceeding 50,000 entries, we can study the mean radio properties as a function of redshift, absolute ultraviolet magnitude, color, balnicity, and line emission strengths. We find that radio emission correlates strongly with most of these parameters. The findings are in some cases surprising, and in all cases exploring new volumes in AGN phase space.

Nuclear Dusty Tori across the Luminosity Range

T. Beckert, B. Vollmer, S. Hoenig, G. Weigelt, W.J. Duschl

Max-Planck-Institute for Radio-astronomy, Germany

Based on a model for a clumpy and dusty torus surrounding accreting supermassive black holes (Beckert & Duschl 2004), we discuss the near to mid-infrared emission of AGN and consequences for the required accretion rates. Both dynamical arguments and the weakness of spectral features in the infrared suggest that dust in the torus is organized in distinct clouds. The optical depth of individual clouds is so large that the clumpiness of the torus is important for the shape of the broad-band spectrum and the appearance of AGN in high spatial resolution observations (Hoenig et al. 2006). The thickness of the torus in the underlying dynamical model depends on the mass accretion rate through the torus on parsec-scales. A geometrically thick torus can exist in luminous AGN for which the ‘unified model’ has been developed. In low luminosity AGN the clumpy distribution of clouds becomes transparent and the appearance in the infrared is markedly different.

Unusual radio BAL quasar 1624+3758

C. Benn, R. Carballo, J. Holt, M. Vigotti, I. Gonzalez-Serrano, K.-H. Mack, R. Perley

Isaac Newton Group, La Palma, Spain

1624+3758, at z = 3.377, is the most radio-luminous BAL quasar known. It has several unusual properties:
(1) The radio rotation measure, 183550 rad/m^2, is the second-highest known for any quasar.
(2) The FeII UV191 1787−A emission line is prominent.
(3) The BAL trough (BALnicity 2990 km/s) is detached by 21000 km/s.
This may be a rare example of an object which is accreting both at a very high rate, and near the Eddington limit.

Properties of the Narrow-line Region in Active Galaxies from Spatially-resolved Spectroscopy

N. Bennert

Institute of Geophysics and Planetary Physics, University of California Riverside, USA

We study the NLRs in type-1 and type-2 Seyfert-galaxies and quasars using optical longslit and integral-field spectroscopy. We derive properties such as size (from the transition of line-ratios in diagnostic diagrams), electron density, ionization parameter, and velocity fields. We discuss consequences for the NLR size-luminosity relation and the unified model.

Refining the Radius-Luminosity Relationship for AGN

M. Bentz, B. Peterson, R. Pogge

Ohio State University, USA

We more accurately quantify the relationship between the size of the broad-line region (BLR) and the luminosity in AGN. We account for host-galaxy contamination of luminosity measurements using high-resolution HST images, and we replace earlier inadequate BLR radius measurements by carrying out a new ground-based reverberation-mapping campaign.

Multi-Color Optical Observations of BL Lacertae

F.-Y. Bian et al.

Department of Physics and Tsinghua Center for Astrophysics (THCA), Tsinghua University, China

We present *BVRI* optical observations of BL Lacertae (BL Lac) obtained in 2004 and 2005. The 2004 observations, lasted about three months from September to November, were used to study the long-term variability of the source. A large and symmetric "anti-flare" was obtained, with similar timescale ($\sim 20-30$ days) and variability amplitude for the decaying and increasing phases. The source was relatively less variable toward the end (~ 30 days) of the observation period. During the 2005 observations, we monitored BL Lac in 6 consecutive nights from Sep 3 to 8, aiming at exploring the particle acceleration and cooling processes through intensively sampling individual intra-day flares. It brightened continuously, with several flare-like events of about one day duration superimposed on this long trend. On average, the source brightened by a rate of ~ 0.1 mag/day. A flare was almost fully sampled on Sep 6. BL Lac was significantly variable over the timescales between ~ 0.01 day and tenths of one day, and showed a typical variability rate of ~ 0.01 mag/hr in several cases. The optical spectra, averaged per night, hardened with increasing fluxes during the decaying phase of the 2004 observations and the increasing phase of the 2005 observations. At each night, however, the color indices appear to be weakly correlated with the brightness. The variations between different bands are strongly correlated at zero lags within the uncertainties in most cases. However, on 2005 Sep 6, the *B* band variations led the *R* band ones by $0.36^{+0.24}_{-0.22}$ hr. This significant time lag is supported by the clockwise "loop-like" evolution in the $B-R$ color indices versus *B* plot. The optical variability properties of BL Lac remarkably resemble the X-ray variability properties of the TeV blazars Mrk 421 and PKS $2155-304$. This implies a common origin for the optical emission from BL Lac and the X-ray emission from the other two sources, plausibly the most energetic tails of the synchrotron emission produced by the ultrarelativistic electrons.

The Accretion Ratios in Seyfert 2 Galaxies with and without Hidden Broad-line Regions

W.-H. Bian, Q.-S. Gu

Nanjing Normal University

Using a large sample of 90 Seyfert 2 galaxies (Sy2s) with spectropolarimetric observations, we tested the suggestion that the presence of hidden broad-line regions (HBLRs) in Sy2s is dependent upon the Eddington ratio. The stellar velocity dispersion and the extinction-corrected OIII luminosity are used to derive the masses of central super-massive black holes and the Eddington ratios. We found that: (1) there is no obvious discrimination in the Eddington ratios for Sy2s with and without HBLRs; (2) below the Eddington ratio threshold of $10^{-1.37}$, all but one object belong to non-HBLRs Sy2s, while at higher Eddington ratio, the possibility to find HBLRs Sy2s is almost the same as that for non-HBLRs Sy2s; (3) nearly all low-luminosity Sy2s (e.g., $L_{\rm OIII} < 10^{41}$ ergs) do not show HBLRs regardless of the column density of neutral hydrogen ($N_{\rm H}$); (4) for high-luminosity Sy2s, the possibility to find HBLRs Sy2s is almost the same as that for non-HBLRs Sy2s, however, when considering only Compton-thin Sy2s with higher OIII luminosity ($> 10^{41}$ergs), we find a very higher detectability of HBLRs ($\sim 85\%$). These results suggested that AGN luminosity plays a major role in not detecting HBLRs in low-luminosity Sy2s, while for high-luminosity Sy2s, the detectability of HBLRs depends not only upon the AGN activity, but also upon the inclination of the torus to the line of sight (if the gaseous absorbing column density is higher at larger inclination).

Stellar and Gaseous Velocity Dispersions in Type II AGNs at $0.3 < z < 0.83$ from the Sloan Digital Sky Survey

W.-H. Bian, Q.-S. Gu, Y. Zhao, L. Chao, Q. Cui

Nanjing Normal University

We apply the stellar population synthesis code by Cid Fernandes et al. to model the stellar contribution for a sample of 209 type II AGNs at $0.3 < z < 0.83$ from the Sloan Digital Sky Survey. The reliable stellar velocity dispersions (σ_*) are obtained for 33 type II AGNs with significant stellar absorption features. According to the $L_{[\rm OIII]}$ criterion of $3 \times 10^8 L_{\rm solar}$, 20 of which can be classified as type II quasars. We use the formula of Greene & Ho to obtain the corrected stellar velocity dispersions (σ_*^c). We also calculate the supermassive black holes masses from σ_*^c in these high-redshift type II AGNs. The [O III] luminosity is correlated with the black hole mass, and no correlation is found between the Eddington ratio and the [O III] luminosity or the corrected [O III] luminosity. Three sets of two-component profile are used to fit multiple emission transitions ([O III]$\lambda\lambda$4959, 5007 and [O II]$\lambda\lambda$3727, 3729) in these 33 stellar-light subtracted spectra. We also measure the gas velocity dispersion (σ_g) from these multiple transitions, and find that the relation between σ_g and σ_*^c becomes much weaker at higher redshifts than in smaller redshifts. The distribution of $< \sigma_g/\sigma_*^c >$ is 1.24 ± 0.76 for the core [O III] line and 1.20 ± 0.96 for the [O II] line, which suggests that σ_g of the core [O III] and [O II] lines can trace σ_*^c within about 0.1 dex in the logarithm of σ_*^c. For the secondary driver, we find that the deviation of σ_g from σ_*^c is correlated with the Eddington ratio.

An XMM-Newton Catalog of Radio-quiet AGN

S. Bianchi, M. Guainazzi, G. Matt, N. F. Bonilla

ESAC, Spain

Multiwavelength analysis on large samples of AGN provides an excellent tool to understand the physics of these objects. We present the largest catalog of XMM-Newton targeted AGN, all with high SNR X-ray spectra. It includes all the radio-quiet objects observed by XMM-Newton, in targeted observations of the AGN panel, whose data are public as of February 2006, for a total of 116 Type 1 and 67 Type 2 sources. The principal X-ray properties of the catalog are complemented by multiwavelength data found in the literature (optical magnitudes, radio fluxes, H_β FWHM, BH masses). We present here results on the correlation of these quantities. In particular, we find convincing evidence for an X-ray Baldwin effect on the narrow component of the Fe K_α line, which can in principle provide useful information about the properties of the torus.

Dust and the Far-UV Break in Quasar Energy Distributions

L. Binette, Y. Krongold, S. Haro-Corzo

Instituto de Astronomer, UNAM, Mexico

The composite spectrum of quasars derived from archived HST-FOS spectra by Zheng et al. (1997) and Telfer et al. (2002) reveals a sharp steepening of the energy distribution (SED) near 100nm. In a recent work (ApJ 631, p661) we have shown that crystalline carbon-based dust could explain the shape of the observed steepening. We now use HST-FOS data of Ton 34, the steepest known quasar SED, to infer further properties of the absorption region.

Accretion Disks in AGN

O. Blaes

University of California, Santa Barbara, USA

I will review the status of accretion disk models of AGN, focusing on recent developments. These include spectropolarimetric observations of Balmer absorption edges and the shape of the putative disk continuum in the infrared, and breakthroughs in our understanding of how magnetorotational turbulence modifies conditions in the disk atmosphere.

Broadband Spectral Properties of Blazars

M. Boettcher

Ohio University, USA

In this review, I will first present a general overview of the phenomenology of blazars, including results from recent multiwavelength observing campaigns on 3C66A and 3C279. Subsequently, I will address issues of modelling broadband spectra, with particular emphasis on the point that spectral information alone is not sufficient to distinguish between competing models and to constrain essential parameters, in particular related to the primary particle acceleration and radiation mechanisms in the jet. Short-term spectral variability information may help to break such model degeneracies, which will require snap-shot spectral information on intraday time scales, which may soon be achievable for many blazars even in the gamma-ray regime with the upcoming GLAST mission and current advances in Atmospheric Cherenkov Telescope technology.

Busting Myths about Broad Absorption Line Quasars

M. Brotherton

University of Wyoming, USA

Once upon a time (and perhaps still), many astronomers believed broad absorption line (BAL) quasars to be normal quasars seen edge-on, accreting at close to Eddington, and completely absorbed in the soft X-rays (at least the low-ionization BAL quasars). None of these myths is true,

and I will present evidence busting each. New observations presented include spectropolarimetry, Chandra spectroscopy, and statistical analysis of thousands of Sloan spectra.

Quasi-Simultaneous Five-Frequency VLBA Observations of PKS 0528+134

H.-B. Cai, Z.-Q. Shen

Shanghai Astronomical Observatory, CAS, China

We present results of Very Long Baseline Array (VLBA) observations of PKS 0528+134 at five frequencies (2.3, 5.0, 8.4, 15.4 and 22.2 GHz). These quasi-simultaneous data enable us for the first time to study the spectral distribution of Very Long Baseline Interferometer (VLBI) components in this highly variable source, from which the central compact core is identified. Our observations indicate that there are two bendings for the jet motion at parsec scale. We provide an approximate spatial fit to the curved trajectory of jet using the Steffen et al.'s helical model. We further investigate the proper motions of three jet components, which all show superluminal motion. At high frequencies (15.4 and 22.2 GHz) we detect a new component, which is estimated to be related to a radio burst peaking at about 2000.

Growth of Massive Black Holes during Radiatively Inefficient Accretion Phases

X.-W. Cao

Shanghai Astronomical Observatory, CAS, China

There is evidence that the growth of massive black holes is mainly through accreting surrounded gases. The massive black holes in most faint active galactic nuclei (AGNs) and even some normal galaxies are still accreting gases, though their accretion rates could be very low. When the accretion rate $\dot{m}$ is lower than the critical value $\dot{m}_{\rm crit}$ ($\dot{m} = \dot{M}/\dot{M}_{\rm Edd}$), the transition of a standard thin disk to a radiatively inefficient accretion flow (RIAF) is expected to occur, The RIAF is very hot, and it radiates mostly in the hard X-ray band. We derive the black hole mass density as a function of redshift from the hard X-ray luminosity function of AGNs assuming massive black holes grow via accreting surrounded gases. Both the contributions of bright AGNs and the RIAFs in faint AGNs/normal galaxies to the X-ray background (XRB) are calculated. Comparing with the observed XRB, we find that about 5 per cent of local black hole mass density came from radiatively inefficient accretion phases, if the black holes are spinning rapidly at $a \sim 0.9$.

A Review of AGN Broad-line Region Photoionization Models

D. A. Casebeer, K. M. Leighly

University of Oklahoma, USA

Photoionization codes such as CLOUDY are invaluable for understanding the physical conditions of the gas emitting AGN broad lines. However, the zeroth-order “one zone" model, in which the lines are assumed to be emitted by gas with a single density and ionization parameter illuminated by an average AGN continuum, cannot qualitatively explain or predict the observed line emission. We review observational and theoretical evidence that the following effects are important: 1.) the BLR emission region is comprised of gas with a range of densities and ionization parameters; 2.) the spectral energy distribution of an individual AGN influences the line ratios and kinematics in an observable way; 3.) the column density, in particular the presence of gas optically thin to the hydrogen continuum, influences the line emission. Other effects including the gas metallicity and radiative transfer will be discussed as time permits.

Warm Absorbers : Stability Curve Analysis

S. Chakravorty, A. Kembhavi, M. Elvis, G. Ferland

IUCAA (Inter University Centre for Astronomy and Astrophysics), India

Thermal equilibrium curves characterizing the stability of warm absorbers in AGN have been studied for different ionizing continuum shapes and chemical abundances using CLOUDY. Nature of this curve is affected by a number of factors particularly the dielectronic recombination coefficients. The absorber can have continuous pressure distribution or multiphase nature.

Mid-infrared Spectroscopy of Arp102B: an ADAF and a Torus ?

R. Chary

Spitzer Science Center, USA

We present sub arcsec Keck mid-infrared imaging and 5-40 micron Spitzer spectroscopy of the active galactic nucleus in Arp102B. The nucleus of the galaxy is clearly detected as a spatially compact mid-infrared source. The 5 year timeline between the Keck and Spitzer data shows some evidence for variability as well as a change in the spectral energy distribution which might be indicative of a transition from a thin disk to an ADAF. We also detect molecular hydrogen emission that is offset from the systemic velocity of the galaxy by 500-1000 km/s. Since the forbidden lines are at the systemic velocity, we suggest that the molecular hydrogen emission arises from a rotating molecular gas structure at a distance of 1 pc.

Flow Physics as Revealed by Observations

D. Chelouche

Institute for Advanced Study, USA

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Cosmological Evolution of the Duty Cycle of Quasars

J.-M. Wang, **Y.-M. Chen**, F. Zhang

Institute of High Energy Physics, CAS, China

Quasars are powered by accretion onto supermassive black holes, but the problem of the duty cycle related to the episodic activity of the black holes remains open as one of the major questions of cosmological evolution of quasars. We obtain quasar duty cycles based on analysis of a large sample composed of 10,979 quasars with redshifts $z \leq 2.1$ from the Sloan Digital Sky Survey (SDSS) Data Release Three. We estimate masses of quasar black holes and obtain their mass function of the present sample. We then get the duty cycle $\bar{\delta}(z) = 10^{-3} \sim 1$ based on the So
l tanś argument, implying that black holes are undergoing multiple episodic activity. We find that the duty cycle has a strong evolution. By comparison, we show that evolution of the duty cycle follows the history of cosmic star formation rate (SFR) density in the Universe, providing intriguing evidence for a natural connection between star formation and triggering of black hole activity. Feedback on star formation from black hole activity is briefly discussed.

Panchromatic Views of Large-Scale Quasar Jets

C.C. Cheung

NRAO and Stanford University, USA

Chandra observations have established that X-ray emission is a common feature of large-scale jets in AGN. In the X-ray jets detected on 100ś kpc-scales in powerful quasars, canonical synchrotron models do not adequately fit the radio-to-X-ray spectra. In such cases, a widely applied model is inverse Compton (IC) scattering off CMB photons by relativistic electrons in a highly relativistic jet (Lorentz factors ~ 10). "Non-standard" synchrotron models have also been proposed but no concensus has been reached. I will give an overview of this subject, highlighting results from recent observations with Chandra and Spitzer. Recent results from studies of the highest-redshift ($z \sim 4$) radio/X-ray quasar jets will be presented. The IC/CMB and synchrotron models have strongly diverging predictions for the X-ray emission at such high-redshifts and this is discussed.

Spitzer Observations of Powerful Radio Sources

K. Cleary, C. R. Lawrence, J. A. Marshall, L. Hao, D. Meier

Jet Propulsion Laboratory, USA

We have measured mid-infrared radiation from an orientation-unbiased sample of 3CRR galaxies and quasars with $0.4 < z < 1.2$ with the IRS and MIPS instruments on the Spitzer Space Telescope. We fit the Spitzer data as well as other measurements from the literature with synchrotron and dust components. At 15 microns, quasars are typically four times brighter than radio galaxies with the same isotropic radio power. Based on our fits, half of this difference is due to the presence of non-thermal emission in the quasars but not the radio galaxies. The other half is due to dust absorption in the radio galaxies but not the quasars.

The Large Scale Structure of LINERs and Seyferts and Implications for Their Central Engines

A. Constantin and Michael Vogeley

Drexel University, USA

I will discuss the clustering of the SDSS low-redshift LLAGN, together with a careful examination of the impact of various AGN classification schemes on understanding their clustering properties. I will present evidence that Seyferts are less clustered than LINERs, and that the difference is connected to their central engine properties.

Mass Outflows from Seyfert Galaxies as Seen in Emission and Absorption

D. M. Crenshaw and S. B. Kraemer

Georgia State University, USA

We summarize the observational properties of the outflowing UV/X-ray absorbers in Seyfert galaxies and the constraints that they impose on dynamical models, including accretion-disk winds. We examine recent evidence that the absorbers have been detected in emission, and discuss the implications of these results for determining the nature of the mass outflows.

Extinction Curves in AGN

B. Czerny
Copernicus Astronomical Center, Poland

The optical/UV spectra of AGN show considerable dispersion. There are strong arguments that extinction by dust is one of the important contributors, and the spectra of practically all AGN need to be corrected in order to recover the intrinsic spectral shape. I will review the proposed extinction curves. Finally, I will address the implication of the required dust composition for the AGN structure.

Eddington Limited Starbursts in the Central 10 pc of AGN

R. Davies, R. Genzel, L. Tacconi, F. Mueller Sanchez, S. Friedrich, A. Sternberg

Max Planck Institut fuer extraterrestrische Physik, Germany

We present results from a survey of nearby AGN using the near infrared adaptive optics integral field spectrograph SINFONI. These data enable us to probe the distribution and kinematics of the gas and stars at spatial resolutions as small as 0.085arcsec. We find strong evidence for recent but short lived starbursts residing in very dense nuclear disks; on scales of less than 10pc these reach Eddington-limited luminosities, perhaps accounting for their short duration. And we show that there may be a relation between the age of the starburst and the accretion rate onto the AGN. In addition, for NGC1068 at a resolution of 6pc, we present direct observations of molecular gas close around the AGN which we identify with the nuclear obscuring material.

New Reverberation Mapping Black Hole Estimate for NGC 4593

K. Denney et al.

The Ohio State University, USA

We present new observations, light curves, and black hole mass estimate for Seyfert-1 NGC4593 from a campaign undertaken in 2005 Spring at MDM Observatory. Reverberation of the broad H_β line in the optical spectrum was targeted, resulting in a time delay and mass with uncertainties greatly reduced from past studies.

Spitzer IRS Spectra of Seyfert 1.8 and 1.9 Galaxies: A view through the torus atmosphere?

R. Deo, M. Crenshaw, S. Kraemer

Georgia State University, USA

We present Spitzer IRS spectra of 12 Seyfert 1.8 and 1.9 galaxies over 5-38 um. We compare the spectral characteristics of this sample to those of Seyfert 1 and Seyfert 2 galaxies from the Spitzer archives. Analysis of the Mid-IR continuum and the silicate 10 um feature allows us to probe the geometry and the dust properties of the torus at the intermediate viewing angles of Seyfert 1.8s and 1.9s.

Multiwavelength Monitoring of NGC 4395: Optical Variability and X-ray/UV/Optical Correlations

L. B. Desroches, et al.

University of California - Berkeley, USA

We present optical photometric and spectroscopic observations of the nucleus of NGC 4395, as part of a multiwavelength reverberation-mapping program. We detect significant continuum variability and interband cross-correlation lags between simultaneous optical/UV and optical/X-ray light curves. We also find suggestive evidence of a Balmer emission-line lag, yielding a black hole mass measurement which is consistent with the value derived from the simultaneous UV data.

The Origin of the Soft X-ray Excess in AGN

C. Done & Gierlinski

University of Durham, UK

The origin of the soft X-ray excess seen in most high mass accretion rate AGN is still an unsolved problem. It is unlikely to represent a true continuum component as its characteristic temperature remains constant over a wide range of AGN black hole mass. It is more likely to be the signature of partially ionised material with high velocity shear, seen either in reflection or absorption. I show that the absorption model can fit both the observed spectra and variability, and review other constraints which show that it may be more physically plausible than reflection.

X-ray Spectral Analysis of a Radio QSO Sample

L.-M. Dou

Yunnan Observatory, CAS, China

We analyze in detail the X-ray spectra of a radio QSO sample from the XMM-Newton Observational data and compare the result with radio and optical spectra.Wéll give the relation of X-ray spectral character and the core dominance.

Unification Issues and the AGN Torus

M. Elitzur

University of Kentucky, USA

Compact sizes indicate that the torus is the region of the clumpy wind coming off the accretion disk in which the clouds are dusty and optically thick. Torus clouds were likely detected in recent water maser observations of NGC 3079. The torus disappears at bolometric luminosities lower than $\sim 10^{42}$ erg/s. At lower luminosities, the broad line region, too, disappears and the AGN main dynamic channel for release of accreted mass seems to be switching from torus outflow to radio jets.

Higher Order Time Series Analysis of Mrk 421

D. Emmanoulopoulos, S. J. Wagner

ZAH, Landessternwarte, Germany

We have analyzed all the archival RXTE data of Mrk 421 taken from the PCA. After homogenized them we performed a higher-order time series analysis in order to characterize the dynamical properties of the emission mechanism. We find a strong indication of genuine non-stationarity in the radiation process.

Radio Polarization Properties for BL Lacs

J. H. Fan, Y. X. WangčňT.X. HuačňY. Liu, J.B. Su, Y.W. Zhang

Guanzhou Normal University, China

In this paper, using the database of the university of Michigan Radio Astronomy Observatory (UMRAO)čňwe studied the polarization properties for 47 BL Lacertae objects and found that (1) The polarizations at higher radio frequency is higher than those at lower frequency, (2) The variability of polarization at higher radio frequency is higher than those at lower frequency, (3) The polarization is correlated with the radio spectral index.

Radio Variability Period for Radio Sources

J. H. Fan, Y. LiučňY.H. Yuan, Y. X. WangčňT.X. HuačňY.W. Zhang, J.B. Su

Guanzhou Normal University, China

In this paper, using the database of the university of Michigan Radio Astronomy Observatory (UMRAO), we analyzed the radio light curves by the power spectral analysis method in search for possible periodicity. The analysis results showed that the radio sources display astrophysically meaningful periodicity ranging from 2.2 to 20.8 years in their light curves at the three frequencies.

A Test of External Compton Models for γ-ray Active Galactic Nuclei

Z.-H. Fan, X.-W. Cao, M.-F. Gu

Shanghai Astronomical Observatory, CAS, China

There is clear evidence that the γ-ray emission from active galactic nuclei (AGNs) can be attributed to inverse Compton scatterings in the relativistic blobs near the massive black holes. If the soft seed photons are from the regions outside the blobs, a linear relation between $(\nu F_{\nu,\gamma}/\nu F_{\nu,\mathrm{syn}} u^*)^{1/(1+\alpha)}$ and Doppler factor δ is expected, where $\nu F_{\nu,\gamma}$ and $\nu F_{\nu,\mathrm{syn}}$ are monochromatic γ-ray and synchrotron

fluxes, respectively, and u^* is the energy density of soft seed photons. We estimate the soft photon energy density in the relativistic blobs contributed by the broad line region (BLRs) in these γ-ray AGNs using their broad-line emission data. The Doppler factors δ are derived from their radio core and X-ray emission data, based on the assumption that the X-ray emission is produced through synchrotron self-Compton (SSC) scatterings. We find two nearly linear correlations: $(\nu F_{\nu,\gamma}/\nu F_{\rm opt}u^*)^{1/(1+\alpha)} \propto \delta^{1.09}$, and $(\nu F_{\nu,\gamma}/\nu F_{\rm IR}u^*)^{1/(1+\alpha)} \propto \delta^{1.20}$, which are roughly consistent with the linear correlation predicted by the theoretical model for external Compton scatterings. Our results imply that the soft seed photons are predominantly from the BLRs in these γ-ray AGNs.

A Bending Jet in a Gamma-Ray Bright Blazar NRAO 530

S.-W. Feng, Z.-Q. Shen

Shanghai Astronomical Observatory, CAS, China

We report on VLBA observations of a Gamma-ray bright blazar NRAO 530 at multiple frequencies. These multi-epoch multi-frequency high-resolution VLBI images exhibit a bending jet to the north of the compact core. Equipartition Doppler-factors of components A, B and C are consistent with a larger flux density in component B, the non-detection of proper motion in component C and a bent jet. We will also present high-resolution polarimetric VLBI images of NRAO 530 made in 1997.

HST and Adaptive Optics Observations with VLT-NACO of NGC 7582, an AGN with Nuclear Starbursts

J. A. Ferndez Ontiveros, A. Prieto, J. Acosta-Pulido

IAC, Spain

NGC 7582 is an AGN with a strong nuclear star formation and it is highly obscured by dust. HST and NIR Adaptive Optics observations with NACO reveal the hidden nucleus and the surrounding star formation regions with extremely high resolution.

Interpreting the Variability of Double-peaked Emission Lines Using Models for Accretion Disk Structures

H. Flohic, M. Eracleous

Pennsylvania State University, USA

We create accretion disk emissivity functions for a variety of disk structures and compute the double-peaked emission line profile that would be observed from such disks in AGNs. We then

compare the computed line profiles and their variability as the structure rotates to data that were collected over several decades.

Integral Field Spectroscopy of Extended Emission-Line Regions around QSOs

H. Fu & A. Stockton

Institute for Astronomy, University of Hawaii, USA

We are using GMOS Integral Field Unit on the Gemini North telescope to observe a sample of extended emission-line regions (EELRs) around QSOs. Here we present the observations of two of the most luminous EELRs at $z < 0.5$. Both regions are associated with steep-spectrum radio-loud QSOs – 3C 249.1 ($z = 0.31$) and 4C 37.43 ($z = 0.37$). The kinematics of the ionized gas measured from the [O III] λ5007 line is rather complex and cannot be explained globally by a simple dynamical model, but some clouds can be modelled individually as having locally linear velocity gradients. The temperatures of the ionized gas appear uniform, while the densities vary from a few tens to a few hundreds cm^{-3}. The emission mechanism of all of the emission clouds, as indicated by the line-ratio diagnostics, is consistent both with s̈hock + precursoränd pure photoionization models. The total mass of the ionized gas is on the order of $10^9 M_{\rm sun}$. We estimate the bulk kinetic energy and momentum of the extended emission-line region of 10^{57} ergs and 10^{50} dyne s, and a dynamical timescale of $\sim$ 10 Myr. By comparing the injection rates of kinetic energy and momentum of different galactic wind models with the observation, we argue that the emission-line clouds are most likely a direct result of the feedback from the quasar.

Suzaku Observation of the Seyfert 2 Galaxy NGC4388

Y. Fukazawa, H. Shirai, D. Yonetoku, T. Tsuru, K. Iwasawa

Hiroshima University, Japan

Suzaku observed the Seyfert 2 galaxy NGC4388 with the highest signal-to-noise ratio than ever. There is a possible feature of Fe-K absorption lines. In addition, the center energy of Fe-K$_\alpha$ and weak Fe-K$_\beta$ line constrains the ionization of the reflector. Moreover, Suzaku detected the 1-day time variability of the spectra up to 40 keV, and could constrain the constant reflection component. These results are thanks to the wide band and the good calibration of Suzaku.

Integrating X-ray and Infrared Views of BAL Quasars

S. Gallagher

University of California, Los Angeles, USA

Quasars are notable for the luminous power they emit across decades in frequency from the far-infrared through hard X-rays; light generated on physical scales ranging from AUs to tens of parsecs contributes at different energies. Each wavelength regime thus offers a different line of sight into the central engine and a separate probe of outflowing material. A complete accounting of the physical characteristics and kinetic power of quasar winds thus requires a panchromatic approach. X-ray and infrared studies are particularly powerful for covering the range of interesting physical scales and ionization states of the outflow. I will present and synthesize the results from an ongoing multiwavelength research program designed to constrain the nature of mass ejection from BAL quasars.

Embedded Clusters around AGN or Modelling the VLTI Observations of the Torus in NGC1068

E. Galliano, D. Alloin

ESO, Chile

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Quasar-Intrinsic Absorbers in the Hubble Space Telescope Archive

R. Ganguly, T. Misawa, M. Hawthorn, C. Grier, R. Lynch, J. Charlton, M. Eracleous

University of Wyoming, USA

We present a catalog of intrinsic absorption-line systems found in the Hubble Space Telescope Archive. The absorbers presented show at least one of the following properties: time-variability, partial coverage, velocity coincidence with the emission line regions. We address various issues related to intrinsic absorbers including frequency, ionization, and kinematical demographics.

The Origin of Wavelength-Dependent Continuum Delays in AGNs - a New Model

M. Gaskell

University of Nebraska, USA

I propose a new model of wavelength-dependent continuum delays in AGNs which quantitatively reproduces the delays, the detailed wavelength dependence, and color hysteresis, and which avoids all of the problems with the ‘lamp postḿodel. The model also explains how the delays vary with epoch of observation.

Results from the Search for Tidal Disruption Flares in the GALEX Deep Imaging Survey

S. Gezari

California Institute of Technology, USA

Abstract:—

ULXs and IMBHs: the answer is blowing in the wind

A. C. Gonçalves & R. Soria

Paris Observatory & Lisbon Observatory, France

It was suggested that phenomenological power-law plus cool disc-blackbody models represent the simplest, most robust interpretation of the X-ray spectra of bright ultraluminous X-ray sources (ULXs); this has been taken as evidence for the presence of intermediate-mass black holes (IMBHs) in those sources. We assess this claim by comparing the cool disc-blackbody model with a range of other models.
Using the XMM-Newton/EPIC spectra of two ULXs in Holmberg II and NGC 4559 as examples, we show that ULX spectra can be fitted equally well by alternative models, turning a soft excess into a soft deficit. We thus propose a more complex physical model, based on a power-law component slightly modified at various energies by smeared emission and absorption lines from highly-ionized, fast-moving gas. We conclude that the presence of a soft excess or a soft deficit depends on the energy range over which we choose to fit the “true" power-law continuum, and that the observed deviations from such a continuum (usually modelled by disc-blackbody components) should not be taken as evidence for accretion disc emission, nor used to infer BH masses. Finally, we speculate that bright ULXs could be in a spectral state similar to, or an extension of the steep-power-law state of Galactic Black Hole candidates, in which the disc is completely comptonized and not directly detectable, and the power-law emission may be modified by the surrounding, fast-moving, ionized gas.

X-ray Variability in Active Galactic Nuclei: Implications of Magnetic Flares

R. W. Goosmann, B. Czerny, M. Mouchet, V. Karas, M. Dovciak, G. Ponti, A. Rozanska, A.-M. Dumont

Center of Theoretical Astrophysics, Astronomical Institute of the Academy, Czech Republic of Sciences

We model the energy-dependent fractional variability amplitude of the Seyfert galaxy MCG-6-30-15 using Monte-Carlo simulations of flare distributions co-rotating with the accretion disk. The observed variability across the iron K_α line can be reproduced. We also investigate time delays between hard and soft X-rays for an individual strong flare event.

STOKES - a Publicly Available Radiative Transfer Code for Polarization Modelling in the Optical/UV

R. W. Goosmann, C.-M. Gaskell, M. Shoji

Center of Theoretical Astrophysics, Astronomical Institute of the Academy, Czech Republic of Sciences

We introduce a new, publicly available Monte Carlo radiative transfer code, STOKES, to model polarization induced by scattering off free electrons and dust grains. It can be used in a wide range of astrophysical applications. We use STOKES to model the polarization produced by scattering regions in active galactic nuclei. The code and documentation are freely available at http://www.stokes-program.info/.

AGN Science with the Large Synoptic Survey Telescope

R. F. Green, W. N. Brandt, D. E. Vanden Berk, D. P. Schneider, & P.S. Osmer

Large Binocular Telescope Observatory, USA

The LSST, with its unprecedented combination of solid angle, photometric and astrometric accuracy, sensitivity, broad wavelength coverage, and time sampling, will provide a new window into the nature of AGNs. Well-defined, large ($> 10^7$ objects) samples of AGNs at $0 < z < 7$ can be constructed via three approaches: location in color-color space, variability, and lack of proper motion.

Local Active Black Hole Mass Functions

Jenny E. Greene, Luis C. Ho

Princeton University, USA

While black holes (BHs) are apparently a ubiquitous component of the nuclei of local spheroids, their role in galaxy evolution remains largely unknown. The tight correlations between galaxy spheroid properties and BH mass provides an important boundary condition for models of the co-evolution of BHs and galaxies. Here we consider another important boundary condition: the local mass function of broad-line active galaxies. We use standard virial mass estimation techniques to examine the distribution of BH masses and accretion rates for active galaxies in the local universe. Comparisons with local galaxy luminosity functions and star-formation rate distributions allow us to compare average current growth rates of galaxies and BHs as a function of mass. We also compare the distribution of BH masses in local broad and narrow-line objects, and find that both populations have a characteristic mass of $\sim 10^7 M_\odot$. Most importantly, this is the first BH mass function to consider BH with masses below $10^6 M_\odot$. The space density of this important population allows us to place constraints on potential mechanisms for the creation of seed BHs in the early universe.

Radio and Optical Properties of the Faint Radio Population

L. Gregorini , I. Prandoni et al.

Dept. of Physics, University of Bologna, Italy

A sub-region previously covered by the sub-mJy ATESP 1.4 GHz (Prandoni et al. 2000a, b) was observed with the ATCA at 5 GHz. In the same region deep optical imaging in UBVRI (I(AB)$\sim$ 26) was available. The data may help to constrain the origin of the radio emission in such faint radio sources and may be fundamental in understanding eventual links to the optical light. Preliminary results of the analysis of these data are: a) The 5 GHz counts do not show evidence of flattening down to the survey limit. b) A flattening of the spectral index with decreasing flux densities was found. At mJy level we have mostly steep-spectrum synchrotron radio sources, while at sub-mJy flux densities we have a composite population, with $\sim$ 60% of the 5 GHz sources showing flat spectra and a significant fraction ($\sim$ 30% at 5 GHz) of inverted-spectrum sources. c) Optical properties of the identified radio sources (i.e.photometric redshifts, galaxy classification etc.) were obtained.

Hard X-ray Black Hole Surveys in Space and Time

J. Grindlay, A. Copete, and J. Hong

Harvard University, USA

Hard X-ray ($> 10-100$keV) surveys for AGN can provide the most complete census of AGN of all types. We report initial results from the added sky coverage enabled by the BAT slew survey (BATSS). Rapid cadence, wide-field HX observations of AGN (and black holes, generally) allow temporal surveys which can constrain BH mass and spin.

The Narrow Line Region: Current Models and Future Questions

B. Groves

Max Planck Institute for Astrophysics, Germany

In this Talk I will present some of the current models we have for the emission from the Narrow Line Region (NLR) of active galaxies. I will discuss why the emission line ratios from this region are constrained to certain observed values, and describe what physical parameters we can derive from the models. I will also discuss the limitations of the current models, and how how the combination of theory and observation can help us solve some of the questions that still remain within the NLR.

The Kinetic Luminosity of Radio Jets in Active Galactic Nuclei

M.-F. Gu, X.-W. Cao, D.-R. Jiang

Shanghai Astronomical Observatory, CAS, China

Abstract:Based on the Königl's inhomogeneous jet model, we estimate the jet parameters, such as bulk Lorentz factor Γ, viewing angle θ and electron number density n_e from radio VLBI and X-ray data for a sample of active galactic nuclei (AGNs). The kinetic luminosity of jets is then calculated using the derived jet parameters. We find a strong correlation between the total luminosity of broad emission lines and the kinetic luminosity of the jets. This result supports the scenario that the accretion process are tightly linked with the radio jets, though how the disk and jet are coupled is not revealed by present correlation analysis. Moreover, we find a significant correlation between the kinetic luminosity and radio extended luminosity. This implies that the emission from the radio lobes are closely related with the energy flux transported through jets from the central part of AGNs.

Neutrino-Dominated Accretion Models for Gamma-Ray Bursts

W.-M. Gu, T. Liu, and J.-F. Lu

Xiamen University

We first refine the fixed concept in the literature that the usage of the Newtonian potential in studies of black hole accretion is invalid and the general relativistic effect must be considered. As our main results, we then show that the energy released by neutrino annihilation in neutrino-dominated accretion flows is sufficient for gamma-ray bursts when the contribution from the optically thick region of the flow is included, and that in the optically thick region advection does not necessarily dominate over neutrino cooling because the advection factor is relevant to the geometrical depth rather than the optical depth of the flow.

Spitzer Reveals SMBHsáctivity in Elliptical Galaxies

Q.-S. Gu, J.-S. Huang, G. Wilson, G.G. Fazio

Department of Astronomy, Nanjing University, China

By using Spitzer IRAC and MIPS images, we investigate infrared properties of a sample of nearby elliptical galaxies. We detect an infrared-red nucleus in one third of elliptical galaxies, which is attributed to the dust reradiation heated by the central AGNs.

Whereabouts of Cold and Hot Gas in Obscured AGN

M. Guainazzi, S. Bianchi

European Space Astronomy Center of ESA, Spain

In this talk we review the constraints on the location, on the physical and geometrical properties of gas in the AGN circumnuclear environment as derived from recent results on: a) X-ray variability for obscured and reprocessed spectral features; b) spatial coincidence between diffuse soft X-ray emission and NLR - as traced by HST O[III] maps - on scales as large as hundreds parsecs; c) correspondence between optical reddening and X-ray obscuration in Compton-thin obscured AGN.

Blazars in Sloan Digital Sky Survey (SDSS)

A. C. Gupta

Yunnan Astronomical Observatory, CAS, China

n this poster, we present the preliminary result of our study of a sample of blazars selected from the spectroscopic data of Sloan Digital Sky Survey (SDSS)

Results of an associated HI absorption search towards the cores of radio galaxies using GMRT

N. Gupta, D. J. Saikia

NCRA-TIFR, Indian

We compare systematically the occurrence of HI absorption in compact and larger objects, study its distribution and evolution of properties with source age. These results along with the recently discovered 21-cm absorption towards the core of radio galaxy 3C452 will be discussed in the light of observations at other wavelengths.

Quasars, SMBHs, and Host Galaxy Evolution

F. Hamann, C. Warner, M. Dietrich, L. Simon, L. Watson

University of Florida, USA

One major goal of quasar research is to understand how they fit into the larger context of SMBH growth and star formation in young (high redshift) galaxies. Our group has focussed on metallicity measures, which indicate that quasars at all redshifts were preceded by substantial star formation - enough to enrich the gas to near or above solar levels. Other studies have reached similar conclusions. The emerging picture is that quasar hosts are massive galaxies - old, red and dormant today, their main episodes of star formation and SMBH growth occurred long ago, roughly during

the quasar epoch. I will briefly review some recent results and the prospects for future work.

The Mid-IR Spectra of the SDSS AGNs

L. Hao et al.

Cornell University, USA

We present the spectra of about 70 AGNs uniformly selected from a complete sample of the SDSS AGN. Among the $\sim$ 4000 AGNs spectroscopically selected from the SDSS, we choose $\sim$ 70 Type I and Type II AGNs uniformly sampled by their [OIII] luminsoities and observe their mid-IR spectra using the Spitzer Infrared Spectrograph. The mid-IR spectra show a great variety. There is no direct correlation between the IR spectral features and the [OIII] luminosities. Type I and Type II AGNs are not clearly distinguished from their IR spectra features. We discuss how this sample can help us to understand the AGN unification scheme and how to understand the effect of extinction to the AGN luminosity function.

Dust/gas Opacities in the UV and X-rays for 11 quasars

S. Haro-Corzo, Y. Krongold and L. Binette

Instituto de Astronomia, UNAM, Mexico

Using HST-FOS and Chandra archived spectra of 11 quasars, we put constraints on how the far-UV and X-Ray spectra may connect in the (unobservable) extreme UV. We compare the dust columns inferred in the UV with the gas absorption columns measured in the X-rays.

3D SPH Simulations of an Accretion Flow from the Circumbinary Disk around the Supermassive Binary Black Holes

K. Hayasaki, S. Mineshige and H. Sudou

Yukawa Institue for Theoretical Physics, Japan

We investigate the accretion onto the supermassive binary black holes from the circumbinary disks, using a three-dimensional (3D) smoothed particles hydrodynamics (SPH) code. We find that the material captured by each black hole fluctuates and has little orbital-phase dependence in a circular binary, whereas it clearly modulates with binary orbit in an eccentric binary due to its time-dependent binary potential. This could provide the circumstantial evidence whether there are supermassive binary black holes in core of merged galaxies.

3-Dimensional Radiative Transfer Simulation of Clumpy Dust Tori

S. F. Hoenig, T. Beckert, K. Ohnaka, G. Weigelt

Max-Planck-Institut fuer Radioastronomie, German

We present our 3-dimensional radiative transfer simulations of clumpy dust tori. The models have been applied to recent NIR and MIR interferometric studies of the Seyfert 2 AGN NGC 1068 and the Circinus galaxy. The model results are in good agreement with the observed infrared SEDs and visibilities.

Emission Line Outflows in Compact Radio Sources - Evidence for AGN-induced Feedback

J. Holt, C. N. Tadhunter, R. Morganti

University of Sheffield, UK

There is much evidence to suggest that compact radio sources are young radio sources. As such, they are ideal laboratories for studying the impact of an AGN on the host galaxy, and vice versa, particularly during the early stages of radio source evolution. We will present new optical data for a sample of compact radio sources exhibiting extreme outflows in their emission line gas. Using a variety of diagnostic tools, we investigate the kinematics, physical conditions and ionization mechanisms of the ionized gas. We determine the mass outflow rates and their significance as an AGN-induced feedback mechanism.

Physical Properties of the Broad Line Region

D. Ilic, G. La Mura, L. C. Popovic, A. I. Shapovalova, S. Ciroi, V. H. Chavushyan, P. Rafanelli, A. N. Burenkov, A. Marcado

Department of Astronomy, Faculty of Mathematics, University of Belgrade, Serbia

We have applied the Boltzmann-Plot method to the Balmer lines intensities to estimate the electron temperature in the BLR. We have studied the Balmer lines of a sample of 90 AGN from SDSS database, as well as the time variability of the same lines of NGC 5548 and NGC 4151.

Emitting Gas Regions in Mrk 493: An Extensive Fe II Line Emission Region

L. C. Popovic, A. Smirnova, **D. Ilic**, A. Moiseev, J. Kovacevic, V. Afanasiev

Department of Astronomy, Faculty of Mathematics, University of Belgrade, Serbia

We present an analysis of the 3D spectra of Mrk 493, a Sy 1 nucleus, observed with integral-field spectrograph MPFS of the SAO RAS 6-m telescope. We found that there is strong Fe II emission

in an extensive region around Sy 1 nucleus (around 4”x4” around the nucleus). Moreover,we fitted the Fe II and H-beta lines in this region in order to compare the kinematical parameters of the Balmer and Fe II line emitting region. Also we have created intensity maps and velocity fields in different emission lines of the ionizing gas as well as velocity fields of star. Diagnostic diagrams have been made in order to define what was a source of gas ionization (active nuclei, hot young stars or shock waves).

Seoul National University Bright Quasar Survey in Optical

M. Im, I. Lee, M.-J. Kim, et al.

Seoul National University, Republic of Korea

We will present recent results from the SNUQSO (Seoul National University Bright Quasar Survey in Optical). SNUQSO is a survey of bright quasars, and the survey aims to provide a complete census on bright quasars ($i < 15-16$ mag) by detecting those that have been missed in previous surveys. Our main scientific goals include (i) discovery of any peculiar bright quasars; (ii) follow-up study of bright quasars through monitoring; and (iii) study of morphology of host galaxies in nearby, bright quasar systems. Our first results include the discovery of a bright quasar which ranks as one of the brightest among previously known quasars.

Infrared 3-4 Micron Spectroscopic Investigations of Nuclear Starbursts in Seyfert 1 and 2 Galaxies

M. Imanishi

National Astronomical Observatory of Japan

We performed infrared 3-4 micron spectroscopy of > 50 Seyfert galaxies. The nuclear starburst luminosities in dusty tori are quantitatively estimated from the 3.3 micron PAH emission luminosities, a good starburst indicator. We find that nuclear starstarburst luminosity positively correlates with AGN power, suggesting their physical connections.

Luminous Buried AGNs in the Local Universe

M. Imanishi

National Astronomical Observatory of Japan

We performed systematic infrared 3-4 micron spectroscopic searches for AGNs deeply buried in dust in all directions. Unlike AGNs surrounded by torus-shaped dust, buried AGNs are elusive, but are predicted to be abundant. We found buried AGN signatures in many luminous infrared

galaxies (Imanishi et al. 2006 ApJ 637 114).

Possible Detection of Faraday Screen

M. Inoue, K. Asada, and H. Nagai

National Astronomical observatory of Japan

The gradient of Faraday rotation measure is thought to indicate helical magnetic field in jets. We point out a possible way to see the Faraday screen which produces the gradient.

Further Evidence of Helical Magnetic Field

K. Asada, **M. Inoue**, S. Kameno, and H. Nagai

National Astronomical observatory of Japan

Using VLBA, we detected RM distribution across the jet in 0333+321. The sign of its RM is opposite at both sides. This is presumably due to the change of direction of the magnetic field, and can be naturally explained by a helical magnetic field.

Extended Emission Line Regions: Nature, Origin & Implications

K. Inskip et al

University of Sheffield, UK

I will discuss recent results obtained from IFU spectroscopy of the extensive emission line regions surrounding powerful radio galaxies. Gas properties are derived using emission line diagnostics. The sources observed display narrow line emission at large distances from the radio axis, with a surprisingly rich variety of gas kinematics and ionization mechanisms (AGN photoionization, shocks, young stars), and present evidence for both jet-cloud interactions as well as possible tidal interactions. I discuss these results in the context of the nature/origin of the emitting material, and also the triggering of AGN in general.

Infrared Interferometric Imaging of Torii

W. Jaffe, Meisenheimer, Raban, Tristram, Rottgering

Leiden Observatory, Netherland

We report the results of measurements with the Mid-Infrared Interferometer (MIDI) on six nearby AGNs. The resolution of the interferometer, about 10 millarcsec or a few parsecs, and the wavelength range, $\sim$ 10 microns, allows us to obtain structural information on the dust regions surrounding and obscuring the nucleus. For three of the AGNs, NGC 1068, Circinus, and Cen A, we are approaching the points where we can “map" the nuclear “torus" regions.

On the X-ray Baldwin effect

P. Jiang, J.-X. Wang & T.-G. Wang

Center for Astrophysics, USTC, China

Most Active Galactic Nuclei (AGN) exhibit a narrow Fe K line at 6.4 keV in the X-ray spectra, due to the fluorescent emission from cold material far from the inner accretion disk. Using XMM-Newton observations, Page et al. found that the equivalent width (EW) of the narrow Fe K line decreases with increasing luminosity, suggesting a decrease in the covering factor of the material emitting the line (presumably the torus). By combining the archival Chandra HETG observations of 34 type 1 AGNs with XMM observations in literature, we build a much large sample with 101 AGNs. We find a similar X-ray Baldwin effect in the sample , however, we note that the anti-correlation is dominated by the radio loud AGN in the sample, whose X-ray spectra might be contaminated by the relativistic jet. Excluding the radio loud AGN, we find a much weaker anti-correlation. We present Monte-Carlo simulations showing anti-correlation can be attributed to the relative short time scale variations of the X-ray continuum, that such a weak anti-correlation can be attributed to the relative short time scale variations of the X-ray continuum.

X-ray Evidences of Nuclear Activity in Close Pairs of Galaxies

E. Jimenez-Bailon

Universidad Roma Tre, Italy

It is believed that AGN activity in the local Universe maybe triggered by galaxy interactions. Taking advantage of high resolution X-ray spectroscopy, we have studied the nuclear activity of a sample of galaxy pairs in order to investigate the hypothesis that interactions could activate the quiescent nuclear supermassive black holes.

BLR: Non-radiative Heating in Strong FeII Emitters

M. Joly, M. P. Von-Cetty, P. Von

Observatoire de Paris-Meudon, France

The optical spectrum of Seyfert 1s reveals a great variety in the FeII emission. We investigate the formation of these lines in some strong FeII emitters and determine the physical conditions of the emission region. We show the need of a non radiative heating to account for the observations.

Intrinsic Absorption in Mrk290 and NGC4593

M. E. Kaiser, et al.

Johns Hopkins University, USA

Approximately half of all Seyfert galaxies show significant amounts of ionized gas in absorption against the central continuum source. We will present X-ray and UV data for Mrk290 and NGC4593 and discuss the characteristics and the correspondence of the intrinsic absorption in these Seyfert galaxies.

Advances in Reverberation Mapping

S. Kaspi

Tel-Aviv University and Technion, Israel

The talk will briefly review the reverberation mapping technique which leads to determination of BH masses. It will focus on the emerging relation between the BLR-size and the AGN luminosity, and will overview recent results of reverberation mapping studies which are starting to cover the full range of AGN luminosity.

Dynamical Evolution of Hot Spots in Radio Loud AGNs

N. Kawakatu & M. Kino

National Observatory of Japan

We model a new dynamical evolution of hot spots connected with cocoon dynamics. By the detailed comparison with two dimensional relativistic hydrodynamic simulations, we show that our model well reproduces the whole evolution of relativistic jets. On the basis of this, I will discuss evolutionary tracks of radio loud AGNs.

Radio Bridges in Powerful FRII Radio Galaxies

P. Kharb, C. OḾea, S. Baum, M. Donahue & E. Guerra

Rochester Institute of Technology, USA

We have carried out an extensive study of the radio bridges in a sample of Fanaroff-Riley type II radio galaxies. The 13 radio galaxies span a large redshift range with $0.4 < z < 1.65$ and angular extents greater that 30″. The observations were made using the Very Large Array in the A, B, C and D-array configurations at 330 MHz, 1.4, 5 and 8 GHz. Majority of the radio sources show little distortion in the radio lobe morphology towards the central galaxy. We have revisited some known radio galaxy correlations using a large combined dataset comprising our radio galaxies and others from the literature, and present the results here. While significant L̀aing-Garringtonéffect is absent in these radio galaxies, the L̀iu-Pooleýcorrelation gains significance.

Constraints on the Star Formation Rate in Active Galaxies

M.-J. Kim, Luis C. Ho, M. Im

Carnegie Observatories (Seoul National University), USA

In order to investigate the ongoing star formation rate of the host galaxies of AGNs, we measured the strength of [O II] and other optical emission lines from 3600 AGNs selected from the Sloan Digital Sky Survey. We find that the host galaxies of Type 1 AGNs experience very modest star formation concurrent with the optically active phase of the nucleus.

The near-IR Shape of the Big Blue Bump: under the Hot Dust Emission

M. Kishimoto, R. Antonucci, O. Blaes

University of Edinburgh, UK

The spectral shape of the Big Blue Bump in the near-IR is very important theoretically, but essentially buried under the strong hot dust emission. I will present the near-IR polarimetry results to reveal the spectral shape for the first time. I will discuss the results in terms of a robust bare-disk prediction and the effect of self-gravity in the outer part of the disk.

Host Galaxies of Hard X-ray Selected Type-2 AGNs at Intermediate Redshifts

G. Kiuchi, K. Ohta, M. Akiyama, K. Aoki, Y. Ueda

epartment of Astronomy, Kyoto University, Japan

Host galaxies of 15 hard X-ray selected type-2 AGNs at $z = 0.1 - 0.6$ (median 0.22) are examined. Thanks to the intrinsic obscuration of a nucleus, spheroid luminosities of the hosts can be derived. We present a black hole mass to spheroid luminosity relation at the redshifts, assuming the Eddington ratio.

Compact Nuclear Starburst in the Central Regions of Seyfert galaxies

K. Kohno

Institute of Astronomy, University of Tokyo, Japan

We present an imaging survey of the CO(1–0), HCN(1–0), and HCO^+(1–0) lines in the nearby 19 Seyfert and 12 starburst galaxies using the Nobeyama Millimeter Array. A new diagnostic of the nuclear power source in dusty active galaxies has been proposed based on millimeter-wave HCN/HCO^+ spectroscopy.

Short-term Line Profile Variations in Selected AGN

W. Kollatschny

Institute for Astrophysics, Germany

I will present results of recent variability campaigns of selected AGN. The spectra have been taken with the 9.2m Hobby-Eberly Telescope. Some AGN show intense line profile variations on time scales of days to weeks only. Other galaxies show smooth line profile variations on time scales of years.

Radio-loud Narrow-line Seyfert 1 Galaxies

S. Komossa, et al.

Max-Planck-Institut fuer extraterrestrische Physik, Germany

We present our results on the first systematic search for (non-radioselected) radio-loud narrow-line Seyfert 1 galaxies. We study the multiwavelength properties of these objects and discuss implications for models of narrow-line Seyfert 1 type galaxies, accretion modes in these objects, and the radio-loud radio-quiet dichotomy of AGN.

Coevolution of Supermassive Black Holes and their Host Galaxies

J. K. Kotilainen, R. Falomo, M. Labita, R. Scarpa, A. Treves

Tuorla Observatory, University of Turku, Finland

Accretion onto a black hole (BH) is the most viable explanation for the huge emitted power in active galaxies. A wealth of observations have shown the presence of a BH in many nearby inactive bulges, suggesting that all massive spheroids harbor a BH. At low redshift, fundamental correlations have been found between the BH mass and the luminosity (mass) and the central velocity dispersion of the host galaxy bulge, indicating a strong relationship between the formation

and evolution of massive bulges and their central BH. We discuss the first results of an ongoing program to investigate the cosmic evolution of this relationship. Rest-UV spectroscopy is used to determine the virial BH masses of a large sample of high redshift quasars for which the host galaxy luminosity is reliably determined from our previous VLT imaging.

Multi-phase Warm Absorber Winds

Y. Krongold

Instituto de Astronomy, UNAM,Mexico

We will discuss recent results on Seyfert Warm Absorber Winds. Using time-evolving photoionization techniques, we were able to find out the physical and geometrical properties of these systems. We will further discuss the roll of these kind of winds (if any) in Cosmological Feedback.

The Radio Properties of Type II Quasars

D. V. Lal and Luis C. Ho

Institute of Astronomy & Astrophysics, Academia Sinica, Taiwan

Quasars (of type I) are the luminous analogs of type I Seyfert galaxies. Within the framework of unified models of active galaxies, the population of quasars of type II recently discovered with Sloan Digital Sky Survey are the luminous analogs of type II Seyfert galaxies. In quasars (of type I) we are looking down the jet (also called as the “pole-on" view), whereas in quasars of type II we are viewing the jet broadside (also called as the “edge-on" view). Since, our knowledge and understanding of the radio properties of these type II quasars is very limited, we will present our, first results from recently scheduled observations, preliminary observational radio properties of these sources and test the predictions of unification scheme models. We will also compare the radio properties of type I and II quasars with the radio properties of Seyfert (radio-quiet) and radio (radio-loud) galaxies, thereby compare the radio jets of “other" AGNs with the radio jets of type II quasars.

A Model for the X-ray Absorption in Compton-thin AGN

A. Lamastra, G. C. Perola, G. Matt

Universit degli studi Roma Tre, Italy

The fraction of Compton-thin AGN appears observationally to be anticorrelated to their X-ray luminosity. The molecular torus seems not to conform to this new constraint. We present a model in which the Compton-thin absorption is due to the molecular gas in the host galaxy disk. The

gravitational effects of the black hole on the disk shape then leads naturally to the observed anti-correlation.

Constraints on the Properties of the BLR from Low Luminosity AGN

A. Laor

Technion, Israel

Although the physical conditions in the BLR are well established, the origin of the gas and its spatial configuration are not as well determined. I will describe some new constraints on these properties obtained from reverberation mappings and high quality spectroscopy of NGC 4395, the lowest luminosity type 1 AGN, as well as SDSS observations of other low luminosity AGN. I will also briefly discuss additional observations which can provide further constraints on the origin and configuration of the BLR.

The Multiwavelength View of the QSO IRAS13349+2438

J. C. Lee, G. A. Kriss, S. M. Linder, W. N. Brandt, C. S. Reynolds, P. M. Ogle, S. Kaspi, D. A. Evans

Harvard University, USA

We discuss coordinated Chandra HETGS, HST, and optical spectral study of the QSO IRAS 13349 + 2438 in the context of ionization structure and location of the warm absorber. The high column X-ray study appears best associated with the few hundred km/s UV absorber; UV properties additionally point to unusual dust distributions.

Observations of Stellar Processes in Active Galaxies

N. A. Levenson

University of Kentucky, USA

Intense star formation is common in active galaxies, and it is often energetically important over a wide energy range. Stars and the consequences of their evolution, including winds and supernovae, can interfere with standard diagnostics used to identify AGN and to quantify their properties, especially in the obscured varieties. High quality, high spatial resolution observations of nearby active galaxies allow these multiple physical processes to be disentangled. These local cases serve as templates for the more distant examples (from which comparable data cannot be obtained), and luminous infrared galaxies (in which the energy sources are often deeply buried and hidden from direct view).

Long-Term Profile Variability in Double-Peaked Emission Line AGNs

K. T. Lewis, M. Eracleous, S. Gezari, J. Halpern, T. Storchi-Bergmann, A. Filippenko

Goddard Space Flight Center, USA

A few percent of Active Galactic Nuclei exhibit broad, double-peaked Balmer emission lines, which originate in the outer accretion disk. During the past decade, a campaign has been carried out to study the profile variability of these objects, which can be used to test various models of accretion disk phenomena; I report on the results of this campaign.

Dust in Active Galactic Nuclei

Aigen Li

Purple Mountain Observatory/Univ. Missouri, USA

My talk will take a comparative study of AGN dust and the general Milky Way (and SMC/LMC) interstellar dust in terms of extinction, dust size distribution, composition, evolution (coagulational growth) and destruction, infrared emission, X-ray scattering.

The clustering of narrow-line AGN in the local Universe

Cheng Li, G. Kauffmann, L. Wang, S. White, T. M. Heckman, Y.-P.Jing

Center for Astrophysics, USTC, China

We have analyzed the clustering of $\sim 90,000$ narrow-line AGN drawn from the Data Release 4 (DR4) of the Sloan Digital Sky Survey. Our analysis aims to address the following questions: a) How do the locations of galaxies within the large-scale distribution of dark matter influence ongoing accretion onto their central black holes? b) Is AGN activity triggered by interactions or mergers between galaxies? To answer these questions, we compute the cross-correlation between AGN and a reference sample of galaxies drawn from the DR4. We compare this to the results obtained for control samples of non-AGN that are matched simultaneously in redshift, stellar mass, concentration, velocity dispersion and in mean stellar age, as measured by the 4000 *AA* break strength. We also compare near-neighbor counts around AGN and the control galaxies. On scales larger than a few Mpc, AGN have the same clustering amplitude as the control sample. This demonstrates that AGN host galaxies and non-AGN control galaxies populate dark matter halos of similar masses. On scales between 100 kpc and 1 Mpc, AGN are clustered more weakly than the control galaxies. We use mock catalogues constructed from high-resolution N-body simulations to interpret this anti-bias and we show that the observed effect can be easily understood if AGN are preferentially located at the centers of their dark matter halos. On scales less than 30-40 kpc, AGN are clustered more strongly than the control sample, but the effect is weak. When compared to the control sample, we find that only one in a hundred AGN have have an extra neighbor within a radius of 30 kpc. This excess does not increase appreciably as a function of the accretion rate onto

the black hole. Although interactions may be responsible for triggering nuclear activity in a few AGN, some other mechanism is required to explain the activity seen in the majority of the objects in our sample.

Particle Acceleration and Radiation in Electromagnetic Jets and Collisionless Shocks

E. Liang and K. Noguchi

Rice University, USA

We summarize latest computer simulations of particle acceleration and radiation mechanisms by both electromagnetic-driven jets and collisionless shocks, using 3D particle-in-cell codes with radiation. We show how spectra, polarization and variability depend on magnetic field, Lorentz factor, pair loading and density. and discuss their applications to AGN data.

The Oxygen Abundance Calibrations from $\sim 40,000$ Star-forming Galaxies

Y.-C. Liang, S.-Y. Yin, F. Hammer et al.

NAOC, China

We select a large sample of $\sim 40,000$ star-forming galaxies from the SDSS-DR2, and derive analytical calibrations for oxygen abundances from their several metallicity-sensitive emission-line ratios: [N II]/Hα, [O III]/[N II], [N II]/[O II], [N II]/[S II], [S II]/Hα, and [O II]/Hβ. This consistent set of strong-line oxygen abundance calibrations will be useful for future abundance studies. The observed relations are consistent with those expected from the photoionization models of Kewley & Dopita (2002), but spread in a relative narrower range of ionization parameters than the models.

The Early X-ray Afterglows of Optically Bright and Dark Gamma-ray Burst

Y.-Q. Lin

Mathematics and Physics Department,Xiamen University of Technology, China

We have examined all the dark and optically bright gammy-ray bursts (GRBs) for which an X-ray afterglow can be detected. We do not find the significant difference of the X-ray and γ-ray distribution of dark GRBs and bright GRBs (GRBs with optical transient, OT GRBS).Thus, from the statistical point of view, there may not have direct relation between dark GRBs and OT GRBs essentially ,and then there may not have difference of the central engine and the properties of the circumburst environment between dark GRBs and OT GRBs.

Synchrotron Flaring in Galactic and Extragalactic Jets

E. J. Lindfors, M. Turler

Tuorla Observatory, Finland

We study the synchrotron flaring behavior of the blazar 3C 279 and miqroquasar Cyg X-3. The properties of a typical outburst are derived from the observations by decomposing multifrequency lightcurves into series of self-similar events. We compare the sources and look into the similarities and differences in flaring behavior of the galactic and extragalactic jets.

The Broad Emission Line Region in NGC3783

P. Lira, Kishimoto, Robinson, Axon, Elvis, Lawrence, Peterson

Universidad de Chile, Chile

We present results from very high signal-to-noise VLT spectropolarimetric observations of the Seyfert 1 galaxy NGC3783 in the 3500-7500A range. The broad H_α and H_β lines show evidence for two components to their profiles with distinctively different spatial and kinematical properties. Also, blue-shifted Balmer absorption lines are seen which could correspond to the accretion disk photosphere or a slow out-flow. A broad component seen bluewards from the Hbeta line very likely corresponds to HeII4686. The HeII line appears very broad and shows distinctively different characteristics from those shown by the Balmer lines, implying that high Ionization lines are produced in a different region than that producing the Balmer lines. These exciting results are combined to draw a picture of the properties of the BELR in this Seyfert galaxy.

Disk corona in AGN: What do we expect?

B.-F. Liu

National Astronomical Observatories/Yunnan Observatory, CAS

The disk-corona evaporation/condensation model (Meyer et al 2000) provides a physical mechanism in explaining many observational phenomena in black hole X-ray binaries. The truncation of the disk, the spectral transition from hard to soft state, the hysteresis between the hard-to-soft and soft-to-hard transitions, the occurrence of intermediate state, and even the quenching of jets at the soft state, can all be ascribed to the results of interaction of disk and corona. Then, what do we expect from the disk corona model in AGNs? Preliminary theoretical investigations show that the corona structure does not depend on mass of the accretion black hole, but the disk does, and so may be the magnetic fields. In this talk, we'll show predictions of disk-corona model in AGNs and discuss the potential interpretation of some observational phenomena which still remain as open questions.

The Jet Power, Radio Loudness, and Black Hole Mass in Radio-loud Active Galactic Nuclei

Y. Liu, D.-R. Jiang, M.-F. Gu

Shanghai Astronomical Observatory Chinese Academy of Sciences

Jet formation is thought to be closely connected with the mass of the central supermassive black hole in active galactic nuclei. The radio luminosity commonly used in investigating this issue is merely an indirect measure of the energy transported through the jets from the central engine and is severely Doppler boosted in core-dominated radio quasars. In this work, we investigate the relationship between the jet power and the black hole mass, by estimating the jet power using extrapolated extended 151 MHz flux density from the VLA 5 GHz extended radio emission, for a sample of 146 radio-loud quasars compiled from the literature. After removing the effect of relativistic beaming in the radio and optical emission, we find a significant intrinsic correlation between the jet power and the black hole mass. It strongly implies that the jet power, like jet formation, is closely connected with the black hole mass. To eliminate the beaming effect in the conventional radio loudness, we define a new radio loudness as the ratio of the radio extended luminosity to the optical luminosity estimated from the broad-line luminosity. In a tentatively combined sample of radio-quiet with our radio-loud quasars, the apparent gap around the conventional radio loudness $R = 10$ is not prominent for the new-defined radio loudness. In this combined sample, we find a significant correlation between the black hole mass and new-defined radio loudness.

VLBI Observations of GHz Peaked Spectrum Radio Sources

X. Liu

Urumqi Observatory, NAOC

We report the results of VLBI observations of GHz-Peaked-Spectrum (GPS) radio sources at 1.6 GHz. We aimed at finding young extragalatic radio sources and exploring the spectral property of the GPS sources.

Harmonic QPOs and Thick Disk p-mode Oscillations in BL Lac Object AO 0235+164

F.-K. Liu, G. Zhao, X.-B. Wu

Astronomy Department, Peking University, USA

Periodic outbursts are observed in many AGNs and usually explained with a supermassive black hole binary (SMBHB) scenario. However, multiple periods are observed in some AGNs and cannot be explained with it. Here we analyze the periodicity of the radio light curves of AO 0235+164 at multi-frequencies and report the discovery of six QPOs in integer ratio 1:2:3:4:5:6 of QPO frequencies, of which the second with period $P_2 = (5.46 \pm 0.47)$yr is the strongest. We fit the radio light curves and show that the initial phases of six QPOs have zero or π differences relative to each other. We suggest a harmonic relationship of QPOs. The centroid frequency, relative strength, harmonic

relationship and relative initial phases of QPOs are independent of radio frequency. The harmonic QPOs are likely due to the quasi-periodic injection of plasma from an oscillating accretion disk into the jet. We estimate the supermassive black hole mass $M_{\rm BH} \simeq (4.72 \pm 2.04) \times 10^8 M_\odot$ and the accretion rate $\dot{m} \simeq 0.007$. With the knowledge of accretion disk, it implies that the inner region of accretion disk of AO 0235+164 is a radiatively inefficient accretion flow. The oscillation accretion is due to the p-mode oscillation of the thick disk probably excited by a SMBHB. The theoretical predications of fundamental oscillation frequency and the harmonics are well consistent with the observations. Harmonic QPOs would be absent when the thick disk becomes geometrically thin due to the increase of accretion rate. We discuss the observations of AO 0235+164 basing on the SMBHB-thick disk oscillation scenario.

X-ray Spectral Features in the Sy1 Galaxy Mrk 335

A. L. Longinotti

ESAC of ESA, Spain

The X-ray spectrum of an XMM-Newton archival observation of the bright Sy1 galaxy Mrk 335 is characterised by a broad and ionised iron K alpha emission line. The broad line can be modeled successfully by relativistic accretion disc reflection models. Partial covering by neutral gas cannot, however, be ruled out statistically as the origin of the broad residuals. Regardless of the underlying continuum, a narrow absorption feature is detected for the first time in this source, at the rest frame energy of 5.9 keV. If the feature is identified with a resonance absorption line of iron in a highly ionized medium the redshift of the line corresponds to an inflow velocity of $0.11-0.15$ c. A simple model for the inflow based on Monte Carlo methods to compute synthetic spectra is presented here for qualitative comparison with the data. This modelling shows that the absorption feature can plausibly be reproduced by infalling gas providing that the feature is identified with FeXXVI. We require the inflowing gas to extend over a limited range of radii at a few tens of gravitational radii to match the observed feature. The narrowness of the absorption line tends to argue against a purely gravitational origin for the redshift of the line, but given the current data quality we stress that such an interpretation cannot be ruled out. Preliminary results from the study on a second and longer observation of this source are also included in this presentation.

86 GHz VLBI Observations of the Southern Blazar PKS 1921-293

R.-S. Lu & Z.-Q. Shen

Shanghai Astronomical Observatory, CAS, China

We report preliminary results from two epoch 86 GHz VLBI observations of the southern mm-bright blazar PKS 1921-293. The high resolution images showed, for the first time, the existence of faint jet emission at 86 GHz bending to the northeast of the compact core.

The Capture of a Giant Star or a Main Sequence Star by Massive Black Holes

Y. Lu, Z. Zheng

The national Astronomical Observatories of China

Since the mass-radius relation is quite different for a giant(G) star and a main sequence (MS) star, we find that the radiation efficiencies for the capture of a G star or a MS star are very different. Given the mass of black holes, the results also show that the size of the accretion disk formed by the tidal debris, the involved viscose and the peak luminosity timescales for the capture of G stars are larger than that for the capture of MS stars. Paying special attention on the radiation efficiency of the capture process, the radiation of the capture of a G star is inefficiency, then relatively fainter, resulting in the total energy of jets are relatively lower. All these may provide a useful way to distinguish the capture of a G star from a MS star star capture process.

Seven-frequency VLBI Observations of the GHz-Peaked-Spectrum source OQ208

W.-F. Luo

Urumqi Astronomical Observatory,CAS, China

We present results of simultaneous Very Long Baseline Array (VLBA) observations of a GHz-Peaked-Spectrum (GPS) radio source OQ208 at 1.4, 1.7, 2.3, 5.0, 6.7, 8.4 and 15.4 GHz. The muti-frequency observation exhibits a high quality component spectrum. We introduce the Doppler effect into the fit to the observed spectral turnovers, both the SSA (synchrotron self-absorption) in two lobes and an extra FFA (free-free absorption) toward the south-west lobe required.

Accretion Disk Models in Active Galactic Nuclei: A Test of Black Hole Mass From Reverberation Mapping

J.-M. Wang, **X.-R. Lv**, R. Staubert, & P. Friedrich

Key Laboratory for Particle Astrophysics,IHEP, China

Reverberation mapping techique dramatically improves the measurement of balck hole mass in active galactic nuclei. However the uncertainties of the black hole mass depends on the geometry of broad line region(the factor *f*), which remains open so far. We make an attempt to test the black hole masses from the reverberation mapping techique in view of energy budget by making use of vertical model of accretion disk. We find that the mapping based mass is underestimated roughly by an order in one third of objects from reverberation mapping sample. We find that the factor *f* depends on the Eddington ratio, and the implication of this dependence is briefly discussed.

X-ray Absorption in AGNs

R. Maiolino

INAF-Observatory of Rome, Italy

We will review our current understanding of gas absorption in AGNs, as traced by X-ray observations, as well as the implications for the physics of the circum-nuclear medium. We will review the distribution of gaseous column densities among AGNs of different types as well as evidences for absorption variability. We will discuss the comparison between X-ray and optical/IR absorption. Finally, we will review our current constraints on the X-ray absorption properties in high redshift sources.

Black Hole Mass/Galaxy Relations, Near and Far

M. Malkan

UCLA, Depf of Physics and Astronomy, USA

Near-IR spectroscopy with AO has been obtained at Keck for several of the nearest bright Sy1 nuclei, to obtain dynamical estimates of the mass of their central black holes.
The Mbh/sigma relation at $z = 0.37$ has been measured in Sy1ś, and deviates from the local relation. HST/ACS imaging, and spectrophotometric monitoring for reverberation estimate of Mbh will be discussed.
The connection between accreting black holes and luminous galaxies is excellent at $z > 0.5$. Evidence from our NICMOS Parallel imaging will be presented.

The Variability Research of Quasars from SDSS

Y.-F. Mao, J.-Y. Wei

National Astronomical Observatories, CAS, China

We do the photometry measurement of 76 low-redshift QSOs by 80cm in Xinglong, and compare the magnitude of B, R bands with those of SDSS. We discuss the correlation analysis of the variability amplitude with the physical parameters of these QSOs and analyze the results.

A New Approach for Estimating the Kinetic Luminosity of Jet in AGNs

M.-L. Ma, X.-W. Cao, and D.-R. Jiang

Shanghai observatory, CAS, China

The Konigl inhomogeneous jet model can successfully reproduce most observational features of

jets in active galactic nuclei (AGN), such as the flat spectrum characteristic of AGNs, core emission and size, when suitable physical parameters are adopted. The proper motion of the jet component sets a constraint on the jet kinematics. We improve the calculation on the radiative processes in the jet given by Konigl(1981), which is no longer valid for the jet with a small viewing angle. Based on the inhomogeneous jet model, we calculate the minimal kinetic luminosity of the jet required to reproduce the measured proper motion of jet component, core size and emission by very-long-baseline interferometry (VLBI). Using this approach, we calculate the minimal kinetic luminosity of the jets for a small sample of flat-spectrum radio AGNs. Our results show that the minimal kinetic luminosity is comparable with the bolometric luminosity for most sources in the sample. For most sources, we find the minimal jet kinetic luminosity can be higher than the bolometric luminosity. The physical implication of the results are discussed in the work.

Jet Properties at Different Scales

L. Maraschi & F.Tavecchio

Brera Astronomical Obseravtory - INAF, Italy

The CHANDRA discovery of X-ray emission from extragalactic relativistic jets at large distances from the nucleus is one of the most important recent results in this field. The multifrequency observational results obtained from our survey and following observations (Sambruna et al. 2004, 2005) will be summarized and discussed in the light of theoretical models for the emission mechanisms (Tavecchio et al. 2000, 2004). The scenario envisaged (Tavecchio et al.2006) suggests that powerful jets propagate freely over large scales and decelerate close to their terminal hot spots possibly due to entrainment.

The Relation among Black Holes, their Host Galaxies and AGN Activity

A. Marconi

INAF-Osservatorio Astrofisico di Arcetri, Italy

I will discuss the genesis of BH-galaxy relations and I will then derive the demography of local BHs. The comparison with expected AGN remnants will then allow me to analyze the connection among BHs, X-ray-background and galaxies with emphasis on the down-sizing inferred from the latest AGN luminosity functions.

X-ray Nature of LINER Nuclei

I. Marquez, O. Gonzalez-Martin, J. Masegosa

Instituto de Astrofisica de Andalucia, Spain

We report the results from an homogeneous analysis of the X-ray (Chandra-ACIS) data available for a sample of 51 LINER galaxies selected from the catalogue by Carrillo et al. (1999) and representative of the population of bright LINER sources. The nuclear X-ray morphology has been classified attending to their nuclear compactness in the hard band (4.5-8.0 keV) into 2 categories: Active Galactic Nuclei (AGN) candidates (with a clearly identified unresolved nuclear source) and Starburst (SB) candidates (without a clear nuclear source). $\sim 60\%$ of the total sample are classified as AGNs, with a median luminosity of LX(2-10 keV)= 2.5×10^{40}erg/s, which is an order of magnitude higher than that for SB-like nuclei. The spectral fitting allows to conclude that most of the objects need a non-negligible power-law contribution. When no spectral fitting can be performed (data with low signal-to-noise ratio), the Color-Color diagrams allow us to roughly estimate physical parameters such as column density, temperature of the thermal model or spectral index for a power-law and therefore to better constrain the origin of the X-ray emission. All together the X-ray morphology, the spectra and the Color-Color diagrams allow us to conclude that a high percentage of LINER galaxies, at least $\sim 60\%$, could host AGN nuclei, although contributions from High Mass X-ray Binaries or Ultra-luminous X-ray sources cannot be ruled out for some galaxies.

High-redshift Obscured Quasars

A. Martinez-Sansigre, et al.

Oxford University/MPIA, UK

I will describe how using well defined mid-IR and radio selection criteria, we found a population of high-redshift ($z \sim 2$) type-2 quasars. Modelling our population, we inferred type-2 to type-1 ratio $\sim 2-3:1$, so most SMBH growth is obscured by dust. I will also discuss the multi-wavelength properties of the sample.

An IR Study of the Starburst in the Torus of NGC 1097

R. Mason, N. Levenson, C. Packham et al.

Gemini Observatory, USA

The possibility that the AGN obscuring torus and nuclear star formation are intimately connected has been raised by many authors on observational and theoretical grounds. The detection of a young stellar cluster within only 9 pc of the nucleus of the LINER/Sy1 NGC1097 appears to support this hypothesis, but the existence of tori in low-luminosity AGN is currently the subject of debate. We present high spatial resolution IR observations and modelling of the nucleus of NGC 1097 that demonstrate that this galaxy does in fact harbor a dusty torus, and examine the source(s) contributing to the dust heating.

X-ray Emission and Reprocessing in AGN

G. Matt

Dipartimento di Fisica, UniversitaŔoma Tre, Italy

I will review the properties of the primary X-ray emission in AGN, as well as the reprocessing from the accretion disc, from both the theoretical and observational points of view.

Relativistic Jets Model and Application for FRI and FRII

Z. Meliani

FOM-Institute for Plasmaphysics ‘Rijnhuizen; Netherland

Steady axisymmetric outflows originating at the hot coronal magnetosphere of a Schwarzschild black hole and surrounding accretion disk are studied in the framework of general relativistic magnetohydrodynamics (GRMHD). The assumption of meridional self-similarity is adopted for the construction of semi-analytical solutions of the GRMHD equations describing outflows close to the polar axis. In addition, it is assumed that relativistic effects related to the rotation of the black hole and the plasma are negligible compared to the gravitational and other energetic terms. The constructed model allows us to extend previous MHD studies for coronal winds from young stars to spine jets from Active Galactic Nuclei surrounded by disk-driven outflows. The outflows are thermally driven and magnetically or thermally collimated. The collimation depends critically on an energetic integral measuring the efficiency of the magnetic rotator, similarly to the non relativistic case. It is also shown that relativistic effects quantitatively affect the depth of the gravitational well and the coronal temperature distribution in the launching region of the outflow. Similarly to previous analytical and numerical studies, relativistic effects tend to increase the efficiency of the thermal driving but reduce the effect of magnetic self-collimation. We will present as well the application of the model to the jet of FRI and FRII.

Supermassive Black Holes and AGNs in Hierarchical Galaxy Formation and Evolution

N. Menci

INAF-Osservatorio Astronomico di Roma, Italy

I will discuss current models to include the feeding of Supermassive Black Holes into ab initio cosmological models of galaxy formation. The role of galaxy interactions in the accretion processes powering the AGNs will be discussed.

Pictor A: from parsec to kiloparsec

G. Migliori, P. Grandi, G.G.C. Palumbo et al.

INAF-IASF Bologna, Italy

We present a complete X-ray study of the radio galaxy Pictor A based on a new XMM-Newton observation. We investigate the compact and the extended regions, i.e. nucleus, jet, hot spots and lobes. In particular we show, for the first time, an X-ray spatially resolved study of the radio lobes. We discuss the physical processes which take place in each component, searching for a comprehensive picture which explains how the different structures are connected.

X-ray Reflection in AGN

L. Miller, T. J. Turner, J. N. Reeves, I. M. George

Oxford University, UK

We analyse X-ray iron-line and continuum reflection in a long observation of Mkn 766 and other nearby AGN including MCG-6-30-15, revealing both ionised reflection close to the black hole and the existence of constant low-ionisation continuum reflection. This analysis gives direct evidence for accretion disc emission, but also indicates that the "red wing" may actually be distant continuum reflection.

Super-Critical Accretion Flow

S. Mineshige

Yukawa Institute, Kyoto University, Japan

Theory of super-critical accretion flow is overviewed in relation to observations. The main topics include multi-dimensional photon trapping effects, high-velocity outflows, anisotropic radiation fields, and possible observational signatures.

Probing Quasar Outflows with Intrinsic Narrow Absorption Lines

T. Misawa, M. Eracleous, J. C. Charlton, G. Chartas, R. Ganguly, D. Tytler, D. Kirkman, N. Suzuki, and D. Lubin

Pennsylvania State University, USA

We present a statistical study of intrinsic NALs, found in 50% of quasars. We identify two NAL families based on ionization state. From monitoring observations of the mini-BAL in HS1603+3820 we find complex absorber structure and large changes in 4 months. Finally we report exploratory X-ray observations of these quasars.

On Magnetic Fields in Broad-line Blazars

R. Moderski, M. Sikora and A. Galkowska

Copernicus Astronomical Center, Poland

High energy spectra of broad-line blazars can be reproduced by both synchrotron-self-Compton (SSC) models and external-Compton (EC) models. However, as is known from numerical modelling, SSC scenarios require much weaker magnetic field than EC ones. In this paper we quantify these results analytically. We show that for powerful blazars the SSC models predict a very low magnetic-to-electron energy density ratio, and that EC models allows equipartition between magnetic fields and electrons.

Spectropolarimetry Surveys of Obscured Active Galactic Nuclei

E. C. Moran

Wesleyan University, USA

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Fast Neutral Outflows: A Major Source of Feedback

R. Morganti, Oosterloo, Tadhunter

ASTRON , the Netherlands

Fast ($\sim$ 1000km/s) outflows of neutral gas (from 21-cm HI absorption) are detected in strong radio sources. The outflows likely originate from the interactions between radio jets and the medium and have mass outflow rates comparable to starburst-driven superwinds. The impact on the evolution of the host galaxies is discussed.

Metallicity Evolution of Active Galactic Nuclei

T. Nagao, R. Maiolino, A. Marconi

National Astronomical Observatory of Japan

We present our recent analysis on the metallicity evolution of AGNs traced by both BLRs and NLRs. The BLR metallicity is investigated through the composite spectra of SDSS quasars, and the NLR metallicity is investigated for high-z radio galaxies.

Star Formation in AGN Accretion Disks

S. Nayakshin

University of Leicester, UK

Observations of young massive stars in the central parsec of our Galaxy provide strong evidence for star formation in massive gaseous AGN disks. Observations, theory and simulations of this important process will be discussed. Implications for black hole growth and AGN unification schemes will be speculated about as well.

Analysis of the BLR Profiles in Fairall 9.

L. S. Nazarova, P. T. OḂrien and N. G. Bochkarev

Euro-Asian Astronomical Society, Russia

We present a study of UV and optic spectra of the active galaxy Fairall 9. We have measured the Lyα/CIV, Lyα/Hβ and Hα/Hβ ratios at the different velocities in the line profiles.The modelling ratios with photoionization code CLOUDY shows that the observed line ratios can be accounted for by two system of clouds. We discuss the possible geometry of the BLR in Fairall 9.

[OIII] Profiles of PG Quasars

C. Nelson, R. Gelderman, T. Moroe, A. Plasek, A. Thompson

Drake University, USA

We present high S/N, high resolution profiles of the [OIII] 5007 emission line for PG quasars with $z < 0.5$. Since the [OIII] kinematics in AGN are predominantly due to motion in the host bulge potential, we can use the widths of the [OIII] line profiles to estimate Mbh for the sample.

Models for Jet Power in Elliptical Galaxies: Evidence for Rapidly Spinning Black Holes

R. S. Nemmen, T. Storchi-Bergmann, R. G. Bower, A. Babul

Instituto de Fisica - UFRGS, Brazil

We employ two models of powering of outflows from ADAF-fed black holes (including the Blandford-Znajek mechanism) to understand the tight correlation between the accretion rates and jet powers of X-ray luminous elliptical galaxies (Allen et al. 2006). We find that nearly maximally spinning holes are needed to account for the above correlation.

Outflows and Narrow-line UV Absorbers: Incidence, Velocity Distribution and Line-Locking

D. Nestor, F. Hamann, P. R. Hidalgo

Institute of Astronomy, University of Cambridge, UK

Ubiquitous in QSO spectra, narrow absorbers are under-studied due to their ambiguous (intrinsic or intervening) natures. Using SDSS, we discern velocity-space distributions of CIV absorbers, measure the excess over assumed non-outflow contributions (thereby determining the minimum "intrinsic fraction") and measure velocity-clustering to determine if the putative radiative line-locking phenomenon is real.

Summary: Theoretical Issues

H. Netzer

Tel Aviv University, Israel

Abstract: —

The Powerful Diagnostics of time-evolving photoionization for AGN Ionized Absorbers

F. Nicastro, Y. Krongold, M. Elvis, S. Mathur

SAO/INAF-OAR, USA

In this contribution I will discuss the powerful diagnostics enabled by time-evolving photoionization on the variable ionized absorbers of AGNs. We will present a revised and updated version of our time-evolving photoionization code (Nicastro et al., 1999, ApJ, 512, 184) and show how uniquely, the use of such models on time-resolved warm-absorbers spectra, can remove the degeneracy between the distance of the absorber from the central ionizing source and the absorber density. This, in turn, allows to tightly constrain all absorber parameters, including the total mass-outflow rate, and so to evaluate the relevance of AGN outflows for cosmological studies. As an example, I will apply such models to the fast-variable X-ray spectra of the Narrow LIne Seyfert 1s MCG-6-30-15 and NGC 4051, and discuss the results that we obtain for these two sources.

Black Hole Masses in NLS1 Galaxies from the X-ray Excess Variance Method

M. Nikolajuk, B. Czerny, P. Gurynowicz

University of Bialystok, Poland

Abstract:We estimate black hole masses in Narrow Line Seyfert 1 (NLS1) galaxies at the basis of

their X-ray excess variance. We apply the standard approach appropriate for Broad Line Seyfert 1 (BLS1) galaxies. In general, we find that the obtained masses are by a factor about 20 too small to agree with values obtained from other methods (reverberation, stellar dispersion). However, we can see that a small subset of our NLS1 objects do not require that multiplication, or the correction factor is less than 3. We find that this subset have got a soft X-ray photon index, $\mathrm{Gamma}_{0.1-2}\mathrm{KeV}$, smaller than 2. We thus postulate that this subclass of NLS1 actually belongs to BLS1.

Disk Truncation in AGN: The Influence of Viscosity

Q. Niu

Yunnan Astronomical Observatory (YNAO), CAS, China

We use the disk-corona model (Meyer et al. 2000) to investigate how the viscosity affects the truncation of disk in low-luminosity AGN (LLAGN) and high/low state transition in AGN. Previous studies show that the corona structure may depend strongly on the value of viscosity. We attempt to do detailed calculations of the coronal structure for a series value of viscous coefficient α. Weĺl give an analytical relation between the mass flowing rate and α, and a relation between the truncation radius and the viscosity. We expect that our results may improve the interpretation of spectral transition between soft and hard states, and the truncation radius in LLAGN.

Mid-IR Spectra of Quasars and Radio Galaxies

P. Ogle, R. R. J. Antonucci & D. Whysong

Spitzer Science Center, USA

Spitzer mid-IR spectra reveal a wealth of new information about the dusty torus and narrow-line region in 3C radio galaxies and PG quasars. We find a connection between silicate emission and the strengths and widths of optical emission lines, which may come from ionized gas ablated from the torus.

Black Hole Mass Measurements with Adaptive Optic Assisted 3D-Spectroscopy

G. Pastorini, A. Marconi

Dipartimento di Astronomia e Scienza dello Spazio, Italy

I will present SINFONI/VLT AO-assisted spectroscopy of 5 Seyfert1/QSO with Reverberation Mapping data. We will assess its reliability for BH mass measurements by using gas and stellar kinematics, and investigate whether active galaxies follow MBH-galaxy correlations. I will also discuss kinematics of coronal lines as inferred from our data.

Masses of Black Holes in Active Galactic Nuclei

B. Peterson

Ohio State University, USA

Abstract: —

A Search for Star Formation in High Redshift Quasars

A. Petric, C. Carilli, F. Bertoldi, R. Mason, A. Beelen, D. Helfand, P. Cox, A. Omomnt

Columbia University, USA

We present radio/mm/submm/IR observations for a sample of 16 $z \sim 2$ QSOs. Four of the mm detected sources have both flux densities consistent with the radio-to-FIR correlation and spectral indices indicative of massive star-formation. However we do not detect PAH line emission as observed in nearby AGN+starburst systems like Mrk 273.

Mid-IR Selected Quasars in the First Look Survey

A. Petric, M. Lacy, L. J. Storrie-Lombardi, A. Sajina, L. Armus, G. Canalizo, S. Ridgway

Columbia University, USA

A central issue in the study of the formation and evolution of galaxies is the connection between the central supermassive black hole (SMBH) and the surrounding bulge stars. MIR observations can contribute to both a more accurate census of overall accretion onto SMBH as infered from QSO surveys, and to a better understanding of the environment of the SMBHs. Here we present an investigation of the spectral energy distributions (SEDs) and star-formation properties of a sample of Mid-IR selected Quasars. The mid-infrared SEDs of our objects are consistent with that expected from clumpy torus models. At longer infrared wavelengths, the radio to infrared ratios of several objects are consistent with those of star-forming galaxies.

VISIR Observations of the Nucleus of NGC 1068

A. Poncelet, G. Perrin, H. Sol

Paris Observatory, France

We present first burst-mode images and high-resolution spectra of the nucleus of NGC 1068 obtained with the VISIR (the VLT Imager and Spectrometer in the mid-IR). Spectra have been obtained with the [ArIII], [SiIV] and [NeII] filters, on the nucleus and on knots aligned with P.A. = 13° traced by deconvolution of VISIR images (Galliano et al. 2005). We study the spatial

evolution of the continuum and emission lines from the core up to tenth of parsecs. Combined with a speckle analysis of VISIR burst-mode images in the [NeII] filter, we attempt to establish the link between the parsec-scale distribution of dust, associated with the dusty torus and already observed with the Mid-InfrareD Interferometer (MIDI) at the VLT (Jaffe, et al. 2004; Poncelet et al. 2006), and more extended diffuse dust probably related to the ionisation cone (Rhee & Larkin 2005, Mason et al. 2005).

Investigation of the Innermost Part of Active Galactic Nuclei by Gravitational Microlensing

L. C. Popovic, P. Jovanovic, T. Petrovic

Astronomical Observatory, Serbia

Gravitational microlensing can be a very useful tool for investigation of the unresolved central part of lensed quasars (X-ray region, continuum source and broad line region) . Gravitational lensing is in general achromatic, however, the wavelength-dependent geometry of the different emission regions of lensed quasars may result in chromatic effects. Since sizes of the emitting regions are wavelength-dependent, microlensing by stars in the lens galaxy will lead to a wavelength-dependent magnification (Popovic & Chartas 2005, MNRAS, 357, 135). This can be used in the investigation of the size and geometry of emission regions (see e.g. Popovic et al. 2001, A&A, 378, 295; Abajas et al. 2002, ApJ, 576, 640; Popovic et al. 2003, A&A, 398, 975; Popovic et al. 2006, ApJ, 637, 620). Here we will discuss the influence of gravitational microlensing on the spectra of lensed quasars, and possible usage of this to investigate the innermost part of quasars.

The Central Parsec Region of Active Galactic Nuclei with Adaptive Optics

A. Prieto

MPIA /IAC, Germany

Adaptive optics and interferometer techniques in the IR are proving to be extremely powerful in penetrating and resolving the central parsecs region of the nearest active galaxies. I will review the main results arisen from a extensive program with the VLT focused on the determination of the parsec scale nuclear structure and associated spectral energy distribution for the brightest and nearest active galactic nuclei in the Southern hemisphere.

Theory of Winds in AGN

D. Proga

Physics Department, University of Nevada, Las Vegas, USA

I present a brief review of results from analytic and numerical studies of winds in active galactic nuclei (AGN). These winds can be driven by magnetic fields, the radiation force, and thermal expansion. In most cases, it is hard to distinguish which of these wind mechanisms dominates both from observational and theoretical point of view. Therefore, I focus on specific theoretical predictions which could help to improve our understanding of the physics of AGN winds.

Investigation of Forbidden Line Variability in the Seyfert Galaxies Nuclei at Crimean Observatory

I. I. Pronik

Crimean astrophysical observatory, Crimea

Investigation of forbidden line variability in the seyfert galaxy nuclei at the Crimean observatory on time scale months and years are carried out since 1970th. Spectra obtained on January 1977 for the NGC 1275, NGC 3227 and NGC 7469 nuclei with the 6-m telescope permit to argue the night-to-night forbidden line variability. It was supposed that this variations can be caused by shocks in flows or jets from the galaxy nuclei.

Influence of Magnetic Fields on Disk Evaporation Processes

L. Qian

Peking University, China

Two-component spectra are often observed in both AGN and X-ray binaries, which are commonly thought to be from RIAF+SSD. One of the most promising model to interpret such a transition between SSD and RIAF is the disk evaporation model first developed by Meyer & Meyer- Hofmeister (1994). In recent years, investigations show that magnetic fields may play an important role in many accretion systems.
We investigate the effects of magnetic fields on the evaporation behaviors. It is found that the radius where the maximum evaporation rate lies decreases with increasing strength of magnetic fields. This implies that the innermost radius of the disk at hard-soft transition decreases with increasing magnetic fields. The truncation radius of the disk in the hard or intermediate states also shows such a trend. Our model predicts that, when transition from hard to soft state occurs, the accretion rate is around 0.03 $M_{\rm Edd}$; while the inner edge of the disk is between 10 R_S and 300 R_S with different fraction of magnetic field involved, less than $\sim 300R_S$ predicted by Meyer et al. 2000. Both the radius and the accretion rate at the hard-soft transition are consistent with the observations.

AGN Research with Future Interferometric Arrays

A. Quirrenbach

Landessternwarte Heidelberg, Germany

Future large optical/infrared interferometers with large telescopes and baselines of several km length can provide sub-milliarcsecond resolution, high sensitivity, and good sky coverage. They can perform imaging spectroscopy of AGN broad line regions, and measure geometric distances to these objects. I will discuss the science case and technical issues for such a next-generation interferometric array.

Observations Of The Blazar OJ 287 in 1956-1965: Further Evidence For The Precessing Binary Black Hole Model

H. Rampadarath, M. J. Valtonen, R. Saunders, H. J. Lehto, R. Hudec, P. Kroll & J. Innis

Physics Department, University of the West Indies St. Augustine,Trinidad and Tobago

Digitized photographic plates of the field of OJ 287 were used to fill the gaps in its light curve for the period 1956-1965. The results shows evidence for five outbursts in this period where the brightness in V has risen above 30 mJy. The results agrees with the precessing binary black hole model.

The XMM Hard Band Slew Survey

R. Saxton, A. Read, M. Freyberg, P. Esquej, B. Altieri

ESA/XMM-SOC, Spain

For 10. Surveys
The XMM-Newton slew survey, with a limiting flux of 4E−12 ergs/s/cm^2, is the deepest medium energy (2−12 keV) X-ray "all-sky" survey performed to date. A first catalogue (XMMSL1) derived from slews over 15% of the sky, containing 261 hard band sources has recently been released. With a positional accuracy of 8 arcseconds, an unambiguous ID can be found in many cases and the extragalactic source fraction is seen to be 70%. The scope for producing a large, fully-identified, flux-limited sample of AGN from the survey is discussed together with its usefulness in pinpointing and identifying AGN found by Integral.

A Direct Comparison of the Infrared properties of Type-1 and Type-2 Quasars

S. Ridgway

Johns Hopkins University/ NOAO, USA

Recent results have revealed that there is probably a very close link between the formation and

evolution of the supermassive black hole population and that of the galaxy population. Therefore, determining the actual number densities and properties of the active black hole population, both in the form of unobscured, type-1 quasars, and obscured, type-2 quasars, over a wide range of epochs is vital to understanding even the basics of galaxy formation. Until recently, it has been very difficult to identify luminosity-matched samples of quasar 1s and 2s, but having such a matched sample (selected on similar, mostly isotropic properties) is essential to resolving basic questions about the relationship between the two types. The two quasar types may be related purely by orientation, or it has also been posited that the type-2 quasars may evolve to type-1s after the initial triggering merging event. If evolution plays a strong role in determining whether a quasar is type 1 or 2, we might expect enhanced star-formation activity in the host galaxies of the type 2 quasars. We have selected a sample of type-2 and type-1 quasars matched in their mid-infrared luminosity from the Spitzer First Look Survey by selecting on their mid-infrared dust emission properties (as measured by Spitzer IRAC photometry). This emission provides a distinctive signature of AGN activity but should not be affected by orientation or torus opening angle. We will present initial results from a Spitzer program to obtain infrared data for this sample. Our IRS spectra allow us to directly compare the infrared SEDs of these two classes of quasar. By comparing the PAH features in the two populations, we can compare star formation activity in the host galaxies. By comparing the shapes of the mid-infrared SEDs and the equivalent widths of the silicate feature at 10 microns we can compare the dust environments of the AGN. We thus expect to gain a much better understanding of the relationship between the type-1 and type-2 quasars when the data is fully analysed.

Time Resolved X-ray Eclipse of NGC 1365: Measuring the Source Size

G. Risaliti

Harvard - Smithsonian Center for Astrophysics, USA

We present an extraordinary X-ray spectral variation of the AGN in NGC 1365, which was observed by Chandra to change from Compton-thin to Compton-thick and back to Compton-thin in four days . This fast variation imply a a size of $\sim 10^{14}$cm for the emitting region, and an extremely compact ($\sim 10^{16}$cm) size of the clumpy circumnuclear absorber.

High Velocity Outflows in Quasars

P. Rodriguez Hidalgo, F. Hamann, D. Nestor & J. Shields

University of Florida, USA

High-velocity quasar outflows might be essential for regulating star formation and facilitating accretion onto the central black hole of QSOs. We have analyzed 1,700 SDSS spectra to study the incidence of CIV outflows with $v > 10000$ km/s but small velocity dispersions, which present challenges to theoretical models. We also discuss new observations that constrain the location and physical nature of these flows.

AGN Research with SALT

E. Romero

SAAO/SALT, South Africa

We present the Southern African Large Telescope (SALT) and its unique instrumentation, its niche areas of research and show how it is envisaged it will impact on AGN research.

Spitzer Observations of Mid-Infrared Emission Lines in LINERS

D. Rupke, E. Sturm, H. Netzer, D.-C. Kim, S. Veilleux, D. Lutz, & A. Contursi

University of Maryland, USA

We present Spitzer mid-infrared spectra of a diverse sample of LINERs. We distinguish between optically-selected and infrared-selected LINERs using fine structure emission lines that arise in the narrow-line region, star-forming regions, and possibly shock-excited regions. Empirical diagrams and photoionization models shed light on the surprising line ratios we observe.

Episodic Activity in Radio Galaxies

D. J. Saikia, C. Konar, M. Jamrozy and J. Machalski

NCRA, Tata Institute of Fundamental Research, India

An important issue concerning active galaxies is the duration of their AGN phase and whether such periods of activity are episodic. We present the results of our study of double-double radio galaxies, which are striking examples of episodic jet activity using both the GMRT and the VLA. We illustrate the importance of multifrequency radio observations across a large wavelength range to determine the spectral ages of the inner and outer doubles and constrain models of these sources. We also discuss fuelling of this episodic activity and the possible occurrence of misaligned double-double radio sources.

The Stellar Populations in the Central 10pc of Seyfert-2 Nuclei

M. Sarzi, J. Shields, R. Pogge, P. Martini

University of Hertfordshire, UK

Building on previous work on low-luminosity active galactic nuclei, I will present a study of the stellar populations in the very central 10 parsecs of a sample of 19 Seyfert-2 galaxies. The analysis is based on HST-STIS spectra and on a careful separation of gas emission and the stellar continuum, featuring state-of-the-art stellar population models and also the inclusion of a feature-

less AGN continuum and of dust extinction. I will discuss our findings on the age, metallicity and abundance of alpha elements of the nuclear populations of these galaxies in the context of the AGN-starburst connection, the formation of galactic nuclei, and the fuelling of supermassive black holes.

Unification of 3CR Radio Galaxies and Quasars

B. Schulz, R. Siebenmorgen, M. Haas, E. Kruegel, R. Chini

California Inst. of Technology, IPAC, USA

With the Spitzer IRS (Houck et al. 2004) we have observed seven powerful FR2 radiogalaxies and seven quasars. Both samples are comparable in both, isotropic 178 Hz luminosity and redshift range. We find for both samples similar distributions in the luminosity ratios of Mid-IR high- and low-excitation lines ($[NeV]/[NeII]$), and of Mid-IR high-excitation line to radio power ratio ($[NeV]/P_{178}$MHz). We further observed Silicate features at 10 and 18 micron in emission. Emission features are limited to the quasar group, while silicate absorption is seen only in the radio galaxies. These observations are all in agreement with unification schemes that explain both groups as the same class of objects seen under different orientation angles.

Quasar Jets at Large Redshift

D. Schwartz

Smithsonian Astrophysical Observatory, USA

X-ray jets in quasars at redshifts greater than 1 should become increasingly prominent due to the increase of the cosmic microwave background (CMB) energy density. Although we do not so far have direct examples of such systems, I will argue that observations to date are still fully consistent with the picture in which the X-ray emission is due to inverse Compton scattering on the CMB.

Silicate Emission in AGN - Evidence for the Torus ?

M. Schweitzer

Max Planck Institute for extraterrestrial physics, Germany

Long sought silictae emission features in AGN have been recently detected by Spitzer spectroscopy, but it remains uncertain how they can be interpreted in unified scenarios. We will present our recent results from Spitzer and SUBARU observations concerning silicate emission in AGN and discuss their interpretation.

UV to Mid-IR SEDs of Low Redshift Quasars

Z.-H. Shang

University of Wyoming University, USA / Tianjin Normal University, China

UV to infrared spectral energy distributions (SED) of quasars are important to understand the accretion of black holes and their surrounding environment, as well as quasar total energy output. We will present UV (some far-UV), optical and Spitzer mid-IR spectra for a sample of low-redshift quasars ($z < 0.4$), compare their properties in different wavelength bands, especially between the UV and mid-IR. We will also discuss the possibility of a better way to estimate quasar bolometric luminosity, which is critical for obtaining Eddington accretion ratio.

Different Angles on Active Galaxies: Where are We with Regard to Unification?

P. Shastri

Indian Institute of Astrophysics, India

With the realization that orientation plays a dominant role in the appearance of active galaxies, much of AGN research has been worked into the operating framework of the 'Unified Scheme', wherein all active galaxies fall into three physically distinct classes: radio-quiet, radio-loud Fanaroff-Riley I and radio-loud Fanaroff-Riley II. We will briefly summarize the current understanding on the domain of validity of the scheme, and discuss some of our recent results in this context, as well as a couple of case studies for illustration.

Black Hole Mass and Host Galaxy Relationships

J.-J. Shen, D. Vanden Berk, D. Schneider

Pennsylvania State University, USA

We have measured the stellar velocity dispersions and estimated the central black hole masses for over 900 broad line AGNs. The host galaxy luminosity-velocity dispersion relationship follows Faber-Jackson relation. The black hole masses are correlated with both the host luminosities and the stellar velocity dispersions.

Pulsating Stellar Secondary Bars and AGN Fueling

J.-T. Shen

University of Texas at Austin, USA

At least 25% of early-type barred galaxies harbor secondary bars. The dynamics of such double

barred galaxies are still not well understood. We recently discovered that the amplitude and pattern speed of secondary bars should be pulsating. Since the bar-within-bar scheme is a potential mechanism of channelling gas to fuel AGN activity, the pulsatory nature of secondary bars may have important implications for understanding the AGN fuelling problem.

The Soft X-ray Properties of QSOs

S. Shen, S. D. M. White, H. J. Mo

Shanghai Astronomical Observatory, CAS, China

We use the ROSAT All Sky Survey to study the soft X-ray properties of a homogeneous sample of 46, 420 quasars selected from the third data release of the Sloan Digital Sky Survey.

High-resolution Millimeter-VLBI Study of Sgr A* - A Supermassive Black Hole at the Galactic Center

Z.-Q. Shen

Shanghai Astronomical Observatory, CAS, China

We present the highest resolution VLBI imaging observations of Sgr A*. These data reveal a wavelength-dependent intrinsic size with an intrinsic emitting region at 3.5 mm of about 1 AU (at a distance of 8 kc to the Galactic Center). When combined with the lower limit on the mass of Sgr A*, these size measurements provide strong evidence that Sgr A* is a super-massive black hole. We also detected a structural variation that results in an intrinsically symmetrical structure that increases in its intrinsic size by more than 25% at 7 mm.

Binary Black Hole Model for the OJ287 Periodic Optical and Radio Outbursts

W.-Z. Shi

Urumqi Observatory, National Astronomical Observatories, CAS, China

Recent observations provide strong evidence for the BL Lacertae object OJ287 exhibiting a periodicity with a double structure in its optical flux variations.Here we suggest a new model,it can not only explain the optical periodicity,but also the radio flares behavior which is double structure and simultaneous with the optical flares.We propose that OJ287 is a binary pair of supermassive black holes.

Implications of the Baldwin Effect and Related Correlations

J. Shields

Ohio University, China

The Baldwin Effect, describing the correlation between emission line equivalent widths and continuum luminosity, continues to be of interest as a clue to broad-line region structure and its underlying physics. In this talk I will review recent results on the Baldwin Effect as seen in AGN ensembles as well as in individual objects (the ïntrinsicB̈aldwin Effect), and discuss their implications.

Detection of Warm Molecular Clouds toward the Obscured AGN IRAS 08572+3915

M. Shirahata, T. Nakagawa, M. Goto, T. Usuda, H. Suto, and T. R. Geballe

ISAS/JAXA, Japan

It is generally accepted that much of the variety in Active Galactic Nuclei (AGN) types is the result of varying orientation relative to the line of sight (unified model for AGN). Molecular tori are the key element of this model. However, physical conditions of the tori have never been observed directly, and the exact nature of the molecular tori is still controversial.
In order to investigate physical conditions of molecular tori in obscured AGN directly, we have made spectroscopic observations of the ultra luminous infrared galaxy IRAS $08572+3915$. We observe fundamental ro-vibration absorption lines of gaseous CO in M-band using the central engine as a background continuum source. This is a unique technique which enable us to determine temperature and column densities of molecular clouds very accurately.
We have detected many absorption lines up to highly excited rotational levels ($J <= 17$), which show the presence of warm ($\sim$ 300 K) molecular gas. This warm component is highly blueshifted (-160 km/s) relative to the systemic velocity of the galaxy and its velocity width is $>$ 200 km/s. Two other components, one near 0 km/s and one near +100 km/s are also detected. We show these observation results and discuss the physical condition of the molecular gas.

Constrains on the Geometry of Torus and Scattering in Sy2s

X.-W. Shu , J.-X. Wang et al.

Center for Astrophysics, USTC, China

Based on a large sample Seyfert 2 galaxies with both optical spectropolarimetric and X-ray data, we show that in additional to the nuclei activity, the obscuration also play an important role in the visibility of polarized broad emission lines in Sy2s. We can reach the results in the unified model if: a) the absorption column density is higher at large inclinations and b) the scattering region is obscured at large inclinations.

OJ 287

A. Sillanpaa, et al.

Tuorla Observatory, Finland

The binary black hole model was proposed to a well known blazar OJ 287 by Sillanp et al. (1988) based on the periodic optical outbursts with a cycle of about 12 years. The authors also predicted the next outburst in 1994 successfully. The next outburst based on this model should occur at the end of September 2006 so during this conference we already know if also this prediction was successful and we can really confirm the binary model. Otherwise we have to find a new model.

Physical Properties of Absorbers in High Redshift Quasars

L. Simon, Fred Hamann, Max Pettini

University of Florida, USA

Emission line studies suggest that quasar environments are typically metal rich, requiring substantial star formation before the observed quasar epochs. We use echelle spectra from VLT-UVES for high-redshift quasars (z = 1.9 to 4.6), selected to contain candidate intrinsic absorbers to test these results and derive basic absorber properties, such as column densities, space densities, and locations relative to the quasars.

IDV observations at 5 GHz with Urumqi 25 meter radio telescope

H.-G. Song , X. Liu

Urumqi Observatory, National Astronomical Observatories, CAS, China

We present the results of Urumqi 25meter radio telescope IDV searches. The targets are from JVAS and CLASS around five pulsars, i.e. J0332+5434, J0826+2637, J1932+1059, J2022+2854, J2022+5154. We present summary tables, light curves, and structure functions from these data sets.

Accretion-Disk Balmer-Line Emission in AGN

I. Strateva, M. Eracleous, W. N. Brandt

Max Planck Institute for Extraterrestrial Physics, German

I will summarize the properties of a special class of AGN whose low-ionization broad-line region is dominated by the accretion disk. I will emphasize recent X-ray studies and comment on the accretion modes, and speculate on the reasons behind the dominant contribution of the accretion

disk to the Balmer-line emission.

Infrared Dust Properties - A Prime Tool For AGN Diagnostics

E. Sturm

Max-Planck-Institut fuer extraterrestrische Physik (MPE)

Mid-infrared spectroscopy of dust features has become a prime diagnostic tool for many issues in AGN research (e.g. torus and NLR properties, starburst-AGN connection, dominant power source, QSO host galaxies, evolution of AGN, etc.). I will summarize recent major developments and results in this field. (Review Talk)

Reverberation Measurements of the Inner Radius of the Dust Torus in Nearby Seyfert 1 Galaxies

M. Suganuma, Y. Yoshii, Y. Kobayashi, T. Minezaki, K. Enya, H. Tomita, T. Aoki, S. Koshida, and B. A. Peterson

National Astronomical Observatory of Japan

We detected clear time-delayed responses of the K-band flux variations to the V-band flux variations for several nearby Seyfert 1 galaxies from monitoring observations by MAGNUM telescope. The lag time can be interpreted as light-travel time between the central engine and the inner edge of the dust torus, which found to be scaled by square root of the central luminosity and locate on the upper boundary of those of the BLR.

Optical Monitoring of TeV-candidate Blazars

L. Takalo, et al.

Tuorla Observatory, Finland

We describe our optical monitoring program on TeV-candidate blazars. These blazars are expected to be observable at GeV-TeV- energies. Our aim in this program is to provide new candidates for MAGIC and other gamma-ray telescopes. Examples of the light curves will be shown.

Kinematic Age Estimate of Mrk 231

S. Tamura, H. Hirabayashi, Y. Murata, K. Asada

Department of Space and Astronautical Science, the Graduate University for Advanced Studies, Japan

Compact Symmetric Object, Mrk 231, was imaged using the VLBA and VSOP archival data. We confirmed a structure of a core and two radio lobes as is shown at previous observations. Based on these two images, we will discuss an expansion velocity of radio lobe and its kinematic age.

Searching for Candidates of Binary Black Bole System

J. Tao

Shanghai Astronomical Observatory, CAS, China

The most direct evidence for a supermassive binary black hole(BBH) can be obtained by detection of the Kepler orbital motion of some emission component close to BHs(Sudou et al. 2003). We propose to observe some BBH candidates, which have evidence both in optical and radio observation, through phase-referencing VLBI observations, to search for direct evidence to confirm the BBHs.

Broad Band X-ray Varaibility of AGN with Suzaku

Y. Terashima

Ehime Univ.,Japan

We present broad band X-ray spectra and their variability of AGNs observed with Suzaku. Suzakuś sensitivity up to 50 keV enables us to perform time resolved broad band spectroscopy of many AGNs. We decompose several emission components in AGNs (power law continuum, reflection continuum, Fe-K line, etc) by using variability.

An X-ray and Optical AGN Survey in the Selected Area 57

D. Trevese, F. Fiore, S. Puccetti, **F. Vagnetti**, V. Zitelli, M. Bershady, K. Boutsia

Universita‘ di Roma “La Sapienza, Italy

We present a medium-deep XMM-Newton X-ray survey in the field of SA57. We discuss X-ray properties of low-luminosity AGNs previously selected through their optical variability. Some low-luminosity AGNs, escaping X-ray detection, show anomalously low X-ray to optical ratio.

A Multiwavelength Study of AGN With COSMOS

J. Trump, C. Impey, P. McCarthy, M. Elvis

University of Arizona, USA

The multiwavelength coverage of the COSMOS project, with deep observations at radio, infrared, optical, UV, and X-ray wavelengths, allows for an unparalleled study of the bolometric properties of AGN. Our sample of spectroscopically confirmed AGN is primarily X-ray and radio selected and is especially sensitive to optically obscured AGN. We couple the multiwavelength spectral energy distribution of our Type 1 and Type 2 AGN along with measurements of their optical emission lines in order to study basic AGN physics. In particular, we estimate black hole masses and bolometric luminosities for ~ 100 Type 1 AGN. Our eventual goal is study of the coevolution of supermassive black holes and their environments with good statistics over most of cosmic time.

X-ray Properties of Narrow Line Fanaroff-Riley II Radio Galaxies

E. Trussoni, A. Capetti, B. Balmaverde

INAF - Osservatorio Astronomico di Torino, Italy

The Fanaroff Riley II radio galaxies include Broad Line (BLRG) and Narrow Line (NLRG) objects, and these last are further divided into High Excitation (HEG) and Low Excitation (LEG) Galaxies. BLRG are commonly associated with non obscured QSO; conversely for NLRG there are clues that LEG are similar to Fanaroff Riley I objects (the nuclear emission originates from a unabsorbed jet), while HEG have a bright nucleus obscured by an edge-on projected torus. Data at X-ray energies can confirm this view: for this purpose present and discuss the X-ray properties of a sample (16 objects from the 3CR) of NLRG with $z < 0.6$ extracted from the Chandra archive.

Narrow Fe K-shell line emission from the Inner Accretion Disk

T. J. Turner, L. Miller, J. Reeves

UMBC and NASA/GSFC, USA

XMM, Chandra and Suzaku have recently revealed complex and exciting behavior in the Fe K-band of Seyfert-type AGN, including the unexpected discovery of narrow components of Fe K emission showing significant Doppler shifts and rapid variability in both flux and peak-energy. A striking result is the discovery of a tight correlation between X-ray continuum flux and that of the ionized component of Fe emission in Mkn 766. Taken together these results provide compelling evidence that there are an important class of narrow Fe emission lines that must originate very close to the central black hole; these offer great diagnostic potential for the inner accretion disk.

AGN X-ray Variability: origin and implications for ‘grand unification´

P. Uttley

Anton Pannekoek Institute, University of Amsterdam, Netherlands

Recent years have seen huge progress in our understanding of X-ray variability in radio-quiet AGN, especially through the remarkable similarities with X-ray variability of stellar-mass black holes. A picture is emerging where AGN X-ray variability is driven by a fluctuating accretion flow, offering the chance to use X-ray timing to probe accretion close to the black hole, and map the X-ray emitting region. The variability properties may also offer a diagnostic of the accretion states of AGN - the latest evidence suggests that AGN show the same variety of states seen in stellar mass black holes, which has strong implications for AGN ǵrand unificationḿodels.

Continuum and Emission-line Variability of High Luminosity Quasars

F. Vagnetti, D. Trevese, D. Paris, G. Stirpe, V. Zitelli

Universita‘ di Roma Tor Vergata, Italy

We report about our ongoing echo-mapping campaign of PG 1247+268 and PG 1634+706 aimed at the determination of the masses of the central black holes. We detect continuum and line variability in both objects despite their high luminosities ($L >\sim 2 \times 10^{46}$ erg/s).

The Massive Host of Radio Galaxies Across Cosmic Time

J. Vernet, N. Seymour, C. De Breuck, D. Stern, R. Fosbury

European southern Observatory

We present results of a comprehensive Spitzer survey of 70 radio galaxies across $1 < z < 5.2$. Using IRAC (3.6-8mu), IRS (16mu) and MIPS (24-160mu) imaging, we decompose the rest-frame optical thru infrared SED into stellar, AGN and dust component. The resultant stellar luminosities imply host stellar masses of 10^{11-12} Msun, similar to most massive local giant elliptical galaxies. The mean stellar mass remains constant up to $z \sim 4$, indicating that the upper end of the mass function is already in place alrearly cosmic epochs.

Dusty Torus in AGN

L. Videla

University of Chile, Chile

We perform imaging on 48 Sy2 galaxies in 6 IR bands. We are separating the contribution of the

torus from the host galaxy by radial profile fitting techniques and we will compare the observed SEDs with theoretical models of torus emission to constraint geometrical and physical parameters

The Realm of the First Quasar in the Universe

C. Vignali

Dipartimento di Astronomia, Universita‘ di Bologna, Italy

Quasars at $z > 4$ provide direct information on the first massive structures to form in the Universe. During the past six years, over 100 quasars at $z > 4$ have been detected in the X-rays; here we review the results from Chandra and XMM-Newton and provide a broad-band perspective.

High-Energy Gamma-Ray Studies of AGN

S. Wagner

LSW Heidelberg, Germany

AGN emit photons up to very high energies. Rapid variability suggests that most of this emission originates in jets. Observations in the GeV and TeV regime probe the emission processes and acceleration mechanisms up to the highest energies. Recent results from TeV experiments will be reviewed and compared to predictions.

The Black-Hole Bulge Relation in AGN with Reveberation Mapping

A. Wandel

Hebrew University of Jerusalem, Israel

Previous work has demonstrated that the BH-bulge relation in Seyfert galaxies and nearby quasars follows that of quiescent galaxies (Wandel 2002; 2005). In AGNs the BH mass can be estimated using both techniques - reverberation mapping and eventually stellar motions. We look into the possibilities to measure this relation for quasars and in particular to high z AGNs, where recent work (Peng et al 2006) has shown a possible deviation from the low z BH-bulge relation.

On the Fraction of X-ray Obscured Quasars

J.-X. Wang

Center for Astrophysics, University of Science & Technology of China, China

Various studies have claimed that the fraction of obscured AGN drops with luminosity. We present our recent study on the fraction of X-ray obscured quasars in Chandra Deep Fields and in the local universe with evidences against this scheme.

Polarization of Quasars: Resonant Line Scattering in the Broad Absorption Line Region

H.-Y. Wang, T.-G. Wang and J.-X. Wang

Center for astrophysics, USTC, China

Polarization is a useful probe to investigate the geometries and dynamics of outflows in BAL QSOs. We perform a Monte-Carlo method to simulate the polarization produced by resonant and electron scattering in BALR. We find a rotated and funnel-shaped thin shell outflow is preferred to explain many observed polarization features.

Jet-Disk Connection in Active Galactic Nuclei

J.-M. Wang

Institute of High Energy Physics, CAS, China

The powerful jets are thought to originate from the disk, but the observational evidence for the jet-disk connection is elusive. A general review on the jet-disk connection will be given for all kinds of AGNs, including the accretion states and jet formation, jet component and some new constraints.

The Black Bole Fundamental Plane from a Uniform Sample of Radio and X-ray Emitting Broad Line AGNs

R. Wang, X.-B. Wu, M.-Z. Kong

Department of Astronomy, Peking University; China

We derived the black hole fundamental plane from a uniform AGN sample. We found the fundamental plane relation has a very weak dependence on the blackhole mass, and a tight correlation between the Eddington luminosity scaled X-ray and radio luminosities for the radio quiet subsample. Additionally, the radio quiet and radio loud AGNs have different power-law slopes in the radio-X-ray non-linear relationship.

How AGN and Star Formation Connect: Eigenvector I as an “AGEÏndicator of AGN

J. Wang, J. Y. Wei & X. T. He

National Astronomical Observatories, CAS, China

The Eigenvector I(EI) space is first extended into IR-color $\alpha(60,25)$ and [OIII]/Hβ_n by performing a PCA on an IR-color selected Seyfert 1.5s sample. Our EI is turned to be dominated by $\alpha(60,25)$ and strongly affected by RF, [OIII]/Hβ_n and EW(Hβ_b), which indicates the E1 space is most likely related to the nuclear SF history. In addition to confirm the work of Xu et al. (2003), we find the Seyferts with both large RFe and [OIII]/Hβ_n are rare. As an case study, a spectacular post-starburst NLS1 SDSSJ085338.27+033246.1 is detailed examined. A simple 0.1Gyr SSP suggests the $< SFR > \sim 70 M_{\odot}/\mathrm{yr}$ which is extremely larger than the current SFR$\sim 3 M_{\odot}/\mathrm{yr}$. A possible evolutionary scenario is proposed.

Dense Outflow from the Type II QSO SDSS J132419.88+053704.7

T.-G. Wang

University of Science and Technology of China

We will present the result of a detailed analysis of UV and optical emission line spectrum as well as the broad band continuum of the type II QSO SDSS J132419.88+053704.7. Three outflow components are identified. UV diagnostic suggests surprising high density for two broad components. Both young and intermediate age stellar population is heavily reddened while the broad components are not. We will discuss the implication of these results.

Diagnostics of Outflows

M. Ward

University of Durham, UK

AGN outflows are inferred from various evidence; X-rays, UV absorption, emission line shifts and profiles. We use the presence and properties of coronal emission lines to investigate links between these different signatures and components such as the accretion disc and torus, with an interpretation in the context of outflow models.

Obscuration of AGNs by Circumnuclear Starbursts

Y. Watabe, M. Umemura

Center for Computational Sciences, University of Tsukuba, Japan We examine the possibility of the relation between the obscuring materials and starburst-origin dusty gas clouds. We pursue the dynamics of clouds, including the effects of radiation forces by an AGN and a starburst. We

conclude that a significant part of AGN obscuration can be attributed to starburst-origin clouds.

Reverberation Mapping of Flows in NGC 5548 and NGC 7469

W. F. Welsh

Dept. of Astronomy, San Diego State University, USA

We present an analysis of archival NGC 5548 H_β line profile data. Using a random-walk interpolation method to patch gaps in the time series, we computed standard CCFs and find: (1) differential measurements show the blue wing lags the red wing, indicative of inflow; (2) the blue/red wing ratio correlates with luminosity; and (3) the blue/red wing variations provide evidence of structural changes in the BLR on the dynamical timescale. We also examine the CIV profile in IUE observations of NGC 7469 and find similar results.

The Possible Relation between SFR and Accretion Rate in Different Type of AGNs

Q.-W. Wu & X.-W. Cao

Shanghai Astronomical Observatory(SHAO), CAS, China

We calculated the accretion rates of low-luminosity LINERs from their hard X-ray luminosities based on spectral calculations for RIAFs. We find that LINERs follow the same correlation between star formation rate and accretion rate defined by normal bright AGNs, when reasonable parameters are adopted for RIAFs.

Iron Line Profile from Relativistic Thick Accretion Disk

S.-M. Wu, T.-G. Wang

Center for Astrophysics, University of Science & Technology of China

We calculate the iron K_α line profile from relativistic accretion disk with finite thickness. We find that the relative height and the separation between the blue and red peaks of the line profile diminish as the thickness of the disk increases. The images of the disk are also investigated.

Weighing Black Holes in Radio-loud AGNs

X.-B. Wu

Peking University, China

I will summarize some difficulties in estimating the black hole mass of radio-loud AGNs and present some results of our recent related works.

Optical Monitoring of S5 0716+714 with a Multi-Passband Filter

J.-H., Wu, X. Zhou, et al.

National Astronomical Observatories, CAS, China

The BL Lac object S5 0716+714 was monitored with a multi-passband filter, which enables light in multi-passbands to pass through it simultaneously. The object shows bluer colors when it is more active. It follows a clockwise loop path on the color versus magnitude diagram, which is consistent with the theoretical prediction.

Impact of Cosmic Rays on Abundance Profiles in Galaxy Clusters

E. Churazov & **F. Xiang**

MPI, Germany

Peaked abundance profile is a characteristic feature of a cluster with a cool core (e.g. Perseus or Centaurus clusters). These abundance peaks are believed to be due to the metals injected into the ICM by stars of a central cD galaxy. Most of the cool core clusters also contain an AGN at the center which injects large amount of relativistic plasma (cosmic rays) into the ICM. If fraction of cosmic rays is mixed with the metals enriched thermal plasma then the resulting mixture might become buoyant will be transported away from the core. Possible observational signatures of this effect are discussed.

Probing the NLR in NLS1s from SDSS Spectroscopy

D.-W. Xu, S. Komossa, H. Zhou, J. Wei and T. Wang

National Astronomical Observatories, Chinese Academy of Sciences, China

We study the NLR properties of NLS1s. Various correlations between the optical properties of NLS1s and BLS1s are detected. We investigate the relation between $M_{\rm BH}$, $L/L_{\rm Edd}$ and physical parameters of the NLR, in order to search for the driver of the observed trends.

Multi-waveband Properties of Narrow-line AGNs at $z \sim 0.7$

R.-B. Yan, and the AEGIS collaboration

University of California,Berkeley, USA

I will present results from the All-wavelength Extended Groth Strip International Survey (AEGIS) on multiwaveband properties of narrow-line Seyferts and LINERs at $z \sim 0.7$. We identify AGN candidates by their optical emission line ratios using spectra from the DEEP2 Galaxy Redshift Survey in the Extended Groth Strip, which has also been observed deeply in X-ray by Chandra, in infrared by Spitzer and in radio at 20cm by VLA. As the slit spectra include both AGN and galaxy light, X-ray and radio data are employed to select a pure AGN sample. We then explore correlations among X-ray, infrared, radio and optical properties of these objects.

An observational test to the viscosity stress in Disk-Corona Structure of AGN

F. Yang,C. Hu, Y.-M. Chen, J.-M. Wang

Key Laboratory for Particle Astrophysics, Institute of High Energy Physics, China

In this paper, we compile a sample consisting of 98 radio-quiet active galactic nuclei so as to test the working magnetic shear stress in a disk-corona system, including radial advection. We use hard X-ray data from *ASCA*, *Chandra*, *XMM-Newton*, *INTEGRAL* and *Swift* observations. We find a strong correlation between the hard X-ray luminosity and bolometric luminosity $L_{\rm Bol}$ and Eddington luminosity $L_{\rm Edd}$, indicating that the fraction f of hard X-ray to the bolometric luminosity is inversely proportional to the Eddington ratio. The correlation favors the shear stress tensor in the form of $t_{r\phi} \propto P_{\rm gas}$. We solve the disk-corona structure with/without advection self-consistently for this working shear stress. We get the $\dot{m}-\tau$ relation and find the disk is still thermally stable in the disk region when the magnetic turbulence and advection cooling are considered simultaneously. I

Iron K Line Diagnostics in AGN

T. Yaqoob

Johns Hopkins University/ NASA, GSFC, USA

We review the observational and theoretical situation with respect to Fe K emission line diagnostics of the putative accretion disk and black hole system in AGN, in particular deconvolution of the distant matter and relativistic lines. We also review some future directions.

Empirical Strong-line Oxygen Abundance Calibrations from Galaxies with Electron Temperature Measurements

S.-Y. Yin, Y.-C. Liang, F. Hammer, J. Brinchmann, B. Zhang, L.-C. Deng, and H. Flores

National Astronomical Observatories, CAS, China

We have selected 531 star-forming galaxies from the Fourth Data Release of the Sloan Digital Sky Survey database (SDSS-DR4) with strong emission lines, including [OIII]4363) detected at a signal-to-noise larger than 5σ, as well as 164 galaxies from the literature with existing Te measurements. O/H abundances have been derived from a two-zone model for the temperature structure, assuming a relationship between high ionization and low ionization species. The comparison between the $(O/H)_{Te}$ and the Bayesian estimates from the MPA/JHU group show that, for almost half of the sample galaxies, metallicities were overestimated by about 0.34 dex on average, which may be due to the treatment for the onset of N enrichment in the Charlotś models used in the SDSS. R_{23} and P-method systematically overestimate the O/H abundance by a factor of ~ 0.20,dex and ~ 0.06,dex, respectively. The N2 index provides more consistent O/H abundances with Te-method, but with a large scatter. The relations of N2, O3N2, S2 with log(O/H) are consistent with the photoionization model calculations. We derive analytical calibrations for O/H from N2, O3N2 and S2 indices on the basis of this large sample of galaxies, as well including the hardness of the ionization as an additional parameter for the N2 index. These allow us to circumvent the systematic offsets between indirect O/H calibration and that from the Te method, although keeping a relatively large scatter.

Different Redshifts among Broad Hydrogen Lines of a Quasar Arise from the Cerenkov Line-like Radiation.

J.-H. You, L. Chen, D.-B. Liu

Department of physics,Shanghai Jiaotong University,China

The most striking property of a newly recognized line emission mechanism,the Cerenkov line-like radiation,is that the peak of line is not at the precise intrinsic position but slightly red-shifted. we call it “Cerenkov line redshift,; which is different from line to line,even for lines emitted from same atom species,e.g., from hydrogen.We collect a number of QSOs for which the redshifts of various hydrogen lines have been given out.Subtracting the cosmological component from the observed total redshift, we really find out additional small redshifts for hydrogen lines.The difference between H alpha and beta lines is in good consistency with the prediction of Cerenkov line-like radiation.

High Resolution Shock-Capturing Hydrodynamic Scheme for Astrophysical Flows

C. Yu

Yunnan astronomical observatory, CAS, China

Many problems at the forefront of theoretical astrophysics require the treatment of dynamical fluid behavior. We present an efficient high resolution shock-capturing hydrodynamics scheme designed to study astrophysical dynamical phenomena. We have implemented weighted essentially non-oscillatory (WENO) scheme to gain fifth order accuracy in space. HLLE approximate Riemann

solver is implemented for flux computation at cell interface. For time integration we apply a third order total variation diminishing (TVD) Runge-Kutta scheme. Examples of jets propagation and binary accretion are presented demonstrating the ability of the scheme to address challenging open questions in astrophysics. We also investigate the well know Papaloizou-Pringle slender torus instability by our new code.

Accretion Models for Low-luminosity AGNs

F. Yuan

Shanghai Astronomical Observatory, CAS, China

I will review our understanding of low-luminosity AGNs in the context of advection-dominated accretion flow model. Special attention will be paid to Sgr A*, the compact radio source located in our Galactic center.

Outflowing Wind from the NLS1 Galaxy Mrk478

Q.-R. Yuan, M. S. Brotherton, R. F. Green, R. Ganguly, Z.-H. Shang , G. A. Kriss

Physics Department of Nanjing Normal University, China

Markarian 478 is a narrow-line Seyfert 1 (NLS1) galaxy that displays very broad ultraviolet emission lines with strong blue wings, suggesting the presence of a highly ionized outflowing wind. We explore the kinematics of this apparent wind using far-ultraviolet through optical spectra obtained with the Far Ultraviolet Spectroscopic Explorer (FUSE), the Faint Object Spectrograph (FOS) of the Hubble Space Telescope(HST), and the 2.1m telescope at Kitt Peak National Observatory, primarily through the analysis of the kinematics and ionization states of the strong, broad blue wing from ions of higher ionization levels (including O VI, N V, He II, and C IV). While the H_{β} emission line is symmetric and has a FWHM of 1300 km/s is consistent with some radiation-driven dynamical models. We conclude that Mrk 478, and by extension other NLS1s with similar emission-line profiles, provide direct evidence for significant decelerating winds present in at least some active galaxies.

Systematic Study of a Large Sample of NLS1 Galaxies from SDSS: First Results

W.-M. Yuan, H.-Y. Zhou, T.-G. Wang, H.-L. Lu, X.-B. Dong, J.-X. Wang, Y. Lu

National Astronomical Observatories/Yunnan Observatory, CAS, China

We report on first results obtained from a systematic study of NLS1 galaxies by making use of the SDSS data. We have compiled a large sample of NLS1s (Zhou et al. astro-ph/0603759) which

comprises $\sim$ 2200 objects selected by examining their spectral parameters derived from SDSS DR3 data. We present some preliminary results on the statistic properties of the sample, such as the fraction of NLS1, the properties of broad and narrow emission lines, and emission in the other wavebands. The black hole mass – velocity dispersion relation for NLS1s was re-examined using the velocity dispersion values estimated from the stellar absorption spectra of the host galaxies.

Helical Magnetic Fields in the jet of 3C 273

R. T. Zavala & G. B. Taylor

Naval Observatory, USA

Using the VLBA we confirm the presence of a Faraday rotation measure gradient transverse to the jet axis of 3C 273. A rotation measure gradient is expected to be the signature of a helical magnetic field wrapping around the relativistic jet.

Effect of Eddington Bias on the Calculation of Hard X-ray Luminosity Function

W.-M. Zhang, S.-N. Zhang

Astrophysics Center of Tsinghua University, China

For some X-ray surveys, the low-detection counting statistics, together with a typical steep source number-flux relation, cause more intrinsically faint sources to be detected at apparently higher fluxes than the other way around. We quantitatively estimate the effect of this “Eddington Biasön the calculation of Hard X-ray Luminosity Function and suggest that this effect could not be neglected for the high redshift and low luminosity sources.

Multiwavelength Variability of TeV Blazars with XMM-Newton

Y.-H. Zhang

Tsinghua University, China

We present optical-UV and X-ray variability of TeV Blazars performed with XMM-Newton.

The HXMT Mission

S.-N. Zhang

Tsinghua University, China

Abstract:—

GRO J1655-40 from ASCA and XMM-Newton Observations

X.-L. Zhang, S.-N. Zhang, G. Sala, J. Greiner, Y.-X. Feng, Y.-S. Yao

MPE, Germany

We analyzed the X-ray spectra of the micro-quasar GRO J1655-40, obtained with 4 ASCA observations during the 1996-1997 outburst and 3 XMM-Newton observations during the 2005 outburst. In all these observations the source is in high/soft state, in which the radiation comes mostly from the disk, and the spectra are free or very lightly affected by other components such as hot corona or jet. We modelled the continuum spectra with both multi-color disk model and relativistic disk model, estimated the inner disk radius of the disk, the color correction factor and the spin of the central black hole. The color correction factor changes from observation to observation, and the central black hole is maximally spinning.

Metal Distributions in Early-Type Galaxies

Z.-L. Zhang, J. Gu, H. Xu

Shanghai Jiao Tong University, China

By analyzing the high-quality Chandra ACIS data we studied the spatial distributions of gas temperature and abundance in the compact group of galaxies HCG 62. We find that there is a remarkable high-abundance arc region at about 35 kpc from the groupś center, which coincides with one of the X-ray cavities and a jet-like structure identified on the 1.43 GHz radio map. Incorporating with the optical evidence we argue that this high-abundance region was formed during a minor merger event, which moves about several 1E6 $M_{\odot}$ of iron outwards from the groupś innermost region where the iron was mostly synthesized in SNe Ia. The off-center metal distribution also has been confirmed in our study of a sample of 9 early-type galaxies. We find that in these galaxies the gas entropy correlates with the B-band luminosity loosely, indicating the importance of mergers in the gas heating and metal outflows.

Non-Hidden Broad Line Region Syfert 2s and the Unified Model of AGN

E.-P. Zhang & J.-M. Wang

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The unified model of Seyfert galaxies suggests that there are hidden broad-line regions (HBLRs) in Seyfert 2 galaxies (S2s). However, there is increasing evidence for the appearance of a subclass

of S2s lacking of HBLR (non-HBLR S2s). An interesting issue arises as to relations of non-HBLR S2s with other types of Seyfert galaxies and whether or not they can be included in the unified model. We assemble two sub-sample consisting of 42 non-HBLR S2s and 44 narrow-line Seyfert 1s (NLS1s) with redshift $z \leq 0.05$ from published literatures to explore this issue. We compare black hole masses in the galactic centers, accretion rates, infrared color ratio ($f_{60\mu\mathrm{m}}/f_{25\mu\mathrm{m}}$) as a potential indicator of the dusty torus orientation, [O III] λ5007, radio and far infrared luminosities. We find that non-HBLR S2s and NLS1s have: 1) similar distributions of the black hole masses ($10^6 - 3\times10^7 M_\odot$) and the Eddington ratios ($L_{\mathrm{Bol}}/L_{\mathrm{Edd}} \sim 1$); 2) significantly different distributions of $f_{60\mu\mathrm{m}}/f_{25\mu\mathrm{m}}$ ratio; 3) similar luminosity distributions of [O III], radio, far infrared. The similarities and differences can be understood naturally if they are intrinsically same but non-HBLR S2s are viewed at larger angles of sight than NLS1s. We thus suggest that non-HBLR S2s are the counterparts of NLS1s viewed at high inclination angles. The absence of the polarized emission line in non-HBLR S2s is caused by the less massive black hole and high accretion rate similar to NLS1s. The implications of the unification scheme of non-HBLR S2s and NLS1s are discussed.

LAMOST Project

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LAMOST is a special reflecting Schmidt telescope used to observe ten million spectra of celestial objects. The telescope has an aperture of 4 meter, f-ratio 5 and a 5° field of view. Its optical axis is fixed and lilted in 25° to the horizontal that runs from south to north. The celestial objects were observed in 1.5 hours as they passed through the meridian. The shape of the reflecting Schmidt plate has to be changed with each different declination and in the tracking process. This is achieved with active optics. It realizes a breakthrough in combining large aperture with wide field of view in optical telescope by using original concepts and ingenious design. There are 4000 optical fibers on the telescope focal surface that will lead to 16 spectrographs. This project aims at the wide field astronomy and astrophysics, and seizes the valuable opportunity to open up the optical spectroscopic observation. This new telescope will bring Chinese astronomy into 21st century with a leading role in wide field spectroscopy, and in the field of large scale and large sample astronomy and astrophysics, whether extra-galactic or galactic.

On the Role of Relativistic Effects in the X-ray Variability of AGN

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We consider the role of relativistic effects in photon propagation on the observed X-ray variability of AGN. We investigate in details the light-bending model for reduced variability of the Fe K_α line compared to the variability of the primary continuum. We show that the range of parameters where the line variability is reduced is very narrow and, in general, different from the range of parameters

required to explain the extremely broad line profile, as observed in, for example, MCG–6–30–15. We also study the model of co-rotating magnetic flares distributed on the disk and show that this should lead to a strong quasi-periodic signal in the power spectra. Lack of such a signal put some constraints on the model. In particular, we show an example of the Seyfert 2 galaxy, NGC 4945, where both the source inclination (i = 90 degr) and black hole mass (10^6 solar masses) are known thanks to mega-masers observations. The heavily obscured (Thomson thickness = 3) X-ray source shows strong variability, with power spectra harder than typical ones, but incompatible with a presence of any quasi-periodic signal.

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