XMM-Newton View of Pairs of Active Galaxies: Activation of Quiescent AGN?

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Abstract: We report XMM-Newton observations of three nearby galaxy pairs, AM0707-273, AM1211-465 and AM2040-674. All members were previously classified as HII galaxies. All the galaxies were detected with XMM-Newton and each member was isolated and analyzed independently. The X-ray spectra reveal strong evidence of AGN activity in AM1211-465NE. We have measured a luminosity of 1.9×10^{40} erg/s in the 2-10 keV band and the presence of a neutral Fe-Ka line with a significance level of 98%. The high n_e value measured, 2.1×10^{19} cm^{-3}, would explain the misclassification of the source. Marginal evidence of AGN nature was found in the X-ray spectra of AM1211-465SW and AM0707-273E. The X-ray emission of the remaining galaxies can be explained with starburst activity. Our results agree with the theory of the activation of quiescent black holes through the gas accretion triggered by encounters of galaxies, particularly in those suffering high absorption.

1. Introduction


Exhaustive studies show that galactic interactions are thought to be effective in driving the gas from the circumnuclear region into the inner nuclear regions. An empirical model (Mortlock et al. 1999) suggests that when the galaxies reach a certain distance, tidal interactions cause gas flowing into the cores of galaxies switching on the BH. Mortlock et al. estimated this activation distance to be in the range of 50-100 kpc.

On the basis of the activation distance model, we have studied with XMM-Newton three nearby galaxy pairs: AM0707-273, AM1211-465 and AM2040-674. Interestingly, all the 6 galaxies in the sample are classified as HII galaxies based on optical and IR data (Sekiguchi & AM2040-674). Interestingly, all the 6 galaxies in the sample are classified as HII galaxies based on optical and IR data (Sekiguchi & AM2040-674). Interestingly, all the 6 galaxies in the sample are classified as HII galaxies based on optical and IR data (Sekiguchi & AM2040-674). Interestingly, all the 6 galaxies in the sample are classified as HII galaxies based on optical and IR data (Sekiguchi & AM2040-674).

2. XMM-Newton Data Analysis

The main conclusions of the XMM-Newton data analysis of three close pairs of similar size galaxies, AM0707-273, AM1211-465, and AM2040-674 are:

- The six galaxies were detected and each pair member isolated. Five allowed spectral fitting (hard power law plus soft thermal component). The luminosities in the 0.3-10 keV band are in the range of (0.3-9)×10^{40} erg/s.
- An AGN was unambiguously unveiled in AM1211-465NE and potentially in its companion. If this is the case, AM1211-465 would be the forth example of a binary AGN. AM0707-273E could also host a low luminosity AGN. AM0707-273W and both members of AM2040-674 are HII galaxies.
- Our results agree with the theory of the activation of quiescent black holes through the gas accretion triggered by encounters of galaxies. This type of analysis probe the importance of X-ray studies of galaxy pairs to accurately determine the nature of their nuclei, in particular in those suffering high absorption.

3. Conclusions

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