

The Connection between Starburst and AGN Activities Probed with the $3.3\mu\text{m}$ PAH Emission

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Abstract. We investigated the connection between AGN and star formation (SF) activities of various kinds of AGNs and their host galaxies. In order to probe SF activity, we measured the $3.3\mu\text{m}$ PAH emission luminosity utilizing the slitless spectroscopic capability of AKARI space telescope. We present the results from two missions, ASCSG and LQSONG.

Keywords. galaxies: active — galaxies: starburst — galaxies: ISM

Although tight correlation between the mass of supermassive black holes and the properties of their host galaxies indicates that black holes and their host galaxies coevolve, the connection between star formation activity and AGN activity remains still mysterious. Utilizing slit-less spectroscopic capability of AKARI space telescope, we carry out two studies to detect and measure star formation activity based on the $3.3\mu\text{m}$ PAH emission feature for AGN, ASCSG, and QSONG. The samples of two AKARI missions represent different subclasses of AGN. For 27 Seyfert galaxies at $z \sim 0.4$ of ASCSG, we detected the $3.3\mu\text{m}$ PAH emission from 7 Seyferts. We also found that the $3.3\mu\text{m}$ PAH line luminosity measured from the central part of galaxies correlates with AGN luminosity (Fig. 1 *right*), although there is no strong correlation between global star formation activity and nuclear activity (Fig.1 *left*). QSONG of which sample includes a majority of reverberation-mapped AGN and many PG QSOs, is the largest mission in terms of sample size. For the QSONG sample, we detected the $3.3\mu\text{m}$ PAH emission from 15 out of 31 reverberation-mapped AGN and 8 out of 53 PG QSOs.

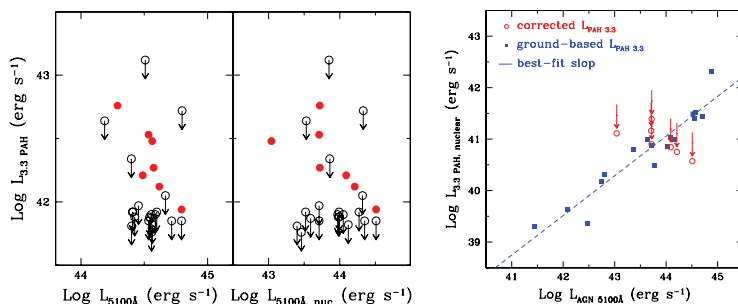


Figure 1. $L_{\text{PAH},3.3}$ against $L_{5100\text{\AA}}$ and AGN luminosity corrected for host galaxy starlight contribution (*left*). The correlation of nuclear $L_{\text{PAH},3.3}$ with AGN optical luminosity (*right*).