

Spitzer IRS Observations of Low-Mass Seyfert Galaxies

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The Sloan Digital Sky Survey has made it possible to identify the first samples of active galaxies with estimated black hole masses below $\sim 10^6 M_{\odot}$. We have obtained *Spitzer* IRS low-resolution spectra, covering 5–38 μm , of a sample of 41 Seyfert galaxies with low-mass black holes. Our sample includes SDSS-selected objects from the low-mass Seyfert 1 sample of Greene & Ho (2004) and the low-mass Seyfert 2 sample of Barth *et al.* (2008), as well as NGC 4395 and POX 52. The goals of this work are to examine the dust emission properties of these objects and investigate the relationship between type 1 and type 2 AGNs at low luminosities and low masses, to search for evidence of star formation, and to use emission-line diagnostics to constrain physical conditions within the narrow-line regions. Here we present preliminary results from this project.

We model our spectra using the IDL code PAHFIT (Smith *et al.* 2007), which simultaneously models the dust temperatures, PAH features, emission lines, and starlight contributions present in each spectrum. The signal-to-noise ratio of our data is generally too low to detect PAH features or emission lines in a large fraction of our objects. Out of 41 Seyfert galaxies, we detect PAH features in 30 objects and high-ionization lines, such as [Ne v] and [O iv], are detected in 18 objects. We find that only one object, POX 52, has [O iv]/[Ne ii] > 3 and therefore is considered the only object with a “pure” AGN spectrum (Sturm *et al.* 2002). The 10 objects with [O iv]/[Ne ii] < 3 are composite objects with contributions from both the AGN and star formation. We also find that the type 2 objects tend to have stronger PAH emission, which could suggest higher star formation rates.

References

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