Co-Evolution of Central Black Holes and Galaxies
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On the Evolutionary Connection Between AGNs and *GALEX* UV-Excess Early-Type Galaxies

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The interplay between active galactic nuclei (AGNs) and their host galaxies' star-formation activities is one of the central topics in pursuing an understanding of galaxy evolution. With the advent of the *Galaxy Evolution Explorer (GALEX)*, we have much more accurate information than ever about the recent star formation (RSF) histories of early-type galaxies within ~ 1.5 Gyr in the local universe. Using a subset of ~ 1000 *GALEX*/SDSS type 2 AGN-host early-type galaxies (E/S0) based on the emission-line ratio diagnosis, we explore how AGNs affect the RSF histories of the early-type hosts and vice versa. In this contribution, we present a preliminary yet interesting result on the intimate connection between AGN activity and the RSF histories of early-type galaxies.

We here examine the relation between the $NUV - r$ colors and $L[\mathrm{O\,III}]/\sigma^4$ ratio for AGN-hosting E/S0s and star-forming E/S0s. The $NUV-r$ color and $L[\mathrm{O\,III}]/\sigma^4$ ratio serve as proxies for the RSF rate and the Eddington ratio, respectively. The sample galaxies are divided into two mass groups, low-mass ($70 \leqslant \sigma < 120\,\mathrm{km\,s^{-1}}$) and high-mass ($120 \leqslant \sigma < 170\,\mathrm{km\ s^{-1}}$) galaxies, as the relation may depend on the mass of galaxies.

Figure 1 shows that the difference in $NUV-r$ between star-forming and Seyfert galaxies tends to increase with increasing $L[\mathrm{O\,III}]/\sigma^4$. This suggests that AGN feedback in Seyfert galaxies may have quenched RSF in their host galaxies within the last ~ 1.5 Gyr. The stronger the AGN feedback, the higher the quenching efficiency. Our results indicate that AGN (negative) feedback has played a critical role in RSF history of E/S0s in the local universe, further supporting the co-evolution between AGNs and their host galaxies.

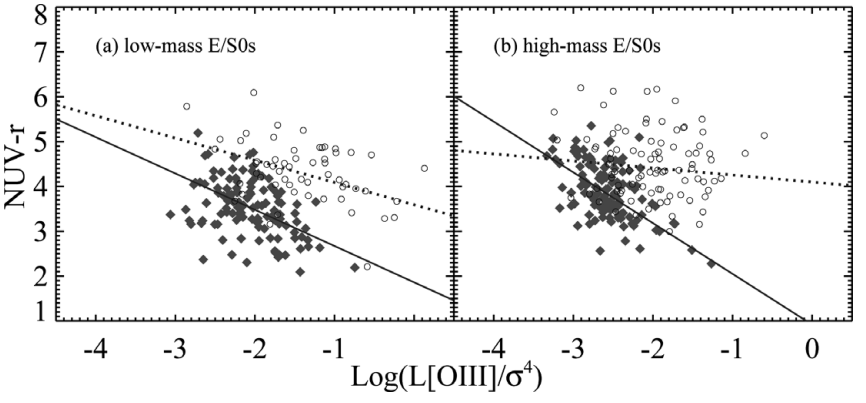

Figure 1. *Left:* The RSF strength vs. AGN power for star-forming (filled diamonds) and Seyfert galaxies (open circles). Solid and dotted lines are the least-squares fit to the star-forming and Seyfert galaxies, respectively. *Right:* As in the left panel, for E/S0s with higher masses.