

The Host Galaxies of 23,000 AGN

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Abstract I will report on the properties of the host galaxies of 23,000 Active Galactic Nuclei (AGN) selected from the main galaxy sample of the Sloan Digital Sky Survey. We have used the extinction-corrected luminosity of the [OIII]5007 emission line as an indicator of AGN power. The kinematics of the narrow emission-lines in AGN correlate strongly with the measured stellar velocity dispersion. The AGN phenomenon is common-place only in massive galaxies with correspondingly large velocity dispersions. AGN hosts have distributions of sizes, stellar densities, and concentrations similar to normal early-type galaxies. While low-power AGN are hosted by galaxies with old stellar populations, the hosts of powerful AGN have young stellar populations distributed over size-scales of several kpc or more. An unusually large fraction of powerful AGN are in galaxies that have experienced a major burst of star-formation within the past ~Gigayear. The hosts of type 2 Seyferts and quasars with the same redshift and [OIII]5007 luminosity have the same young stellar population. The simplest interpretation is that only massive galaxies contain suitably massive nuclear black holes, and that only galaxies with recent/on-going star-formation have a rich supply of cool interstellar gas to fuel the black hole. This combination is rare today, but must have been more common at early epochs. The connection between star-formation and black hole fuelling is consistent with the close relationship between black hole mass and the properties of the bulge component on galaxies today.