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DOUBLE-PEAKED EMITTERS: A TRANSITION PHASE IN THE EVOLUTION OF AGN?

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Double Peaked (DP) AGN show broad double-peaked profiles around Balmer and Mg II emission lines. Around 150 DP AGN are known at present. The accretion disk models can fit only ∼ 50% of DP profiles (Lewis & Eracleous 2006) and the origin of the rest DP profiles is still not well understood. We aim to explore the physical characteristics of the central engine of DP emitters. Here, we present a relation between the accretion rate and BH mass for DP AGN.

We select a sample of 39 DP SDSS AGN from Strateva et al. (2003). The presence of DP emission line profiles and their high variability makes it difficult to estimate the black hole (BH) masses from the empirical relation which links the size of the broad-line region (BLR) and the optical continuum luminosity (Kaspi et al. 2000). We use the BH mass-star velocity dispersion relation (Tremaine et al. 2002) to estimate the BH masses. Velocity dispersions are derived by fitting the stellar population synthesis modeled (STARLIGHT; Cid Fernandes et al. 2005; Mateus et al. 2006) to the observed spectra. To estimate the Eddington-rate ($L_{\rm bol}/L_{\rm Edd}$, where $L_{\rm bol} \sim 9\ L_{5100\text{Å}}$) of the AGN, we have subtracted the stellar component from the optical continuum.

Wu & Liu (2004) reported a negative correlation between the separation of DP line profiles and Eddington-rate. Our data does not show any significant correlation. We believe that the correlation of Wu & Liu (2004) may be spurious because the BH mass of some AGN can be inaccurate due to overestimation of the FWHM the DP line profiles. Our estimate of BH masses is based on the measurements of stellar velocity dispersion and it is free of systematical biases.

To compare the Eddington-rate-BH mass relation for different types of AGN, we compiled from the literature the samples of different spectroscopic types of AGN within a redshift range from 0 to 0.3.

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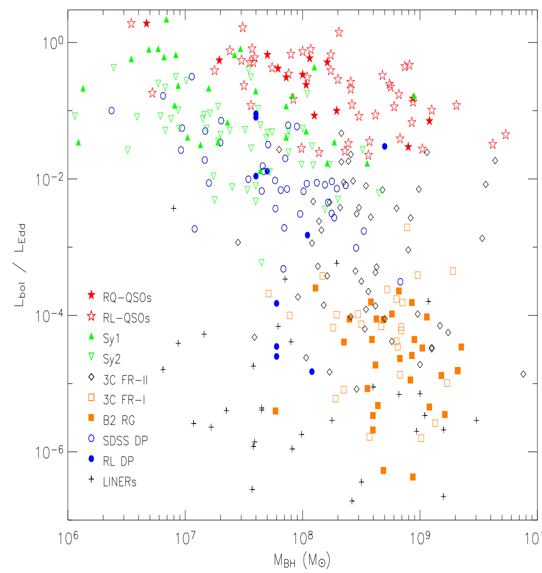

Fig. 1. The Eddington-rate vs. BH mass for different populations of AGN. The BH mass of DP AGN varies by a factor of 10^2, while the accretion rate changes by three orders of magnitude.

The mean Eddington-rate changes gradually from 2.6×10^{-6} to 1.3×10^{-1} from LINERs to quasars. The Kolmogorov-Smirnov test shows that the DP AGN are significantly different from other populations of AGN. We conclude that different types of AGN occupy different regions in the Eddington-rate-BH mass diagram, while DP emitters have a wide range of Eddington rates from 10^{-5} to 10^{-1} (from LINERs to radio-loud quasars (RL-QSOs); see Figure 1). This indicates that the population of DP AGN is not a distinct class of AGN. It is more likely that DP AGN represent a transition stage in the evolution of all types of AGN. This work is still in progress.

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