

A New Look at Quasar Accretion Disks

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Abstract

The physics of active black holes (BHs) is governed by three key parameters: their mass, spin, and accretion rate. Understanding the cosmic evolution of these parameters is crucial for tracing back the growth of the BHs to the epoch of their formation. We have selected a unique AGN sample, in a narrow redshift range around $z = 1.55$, based on both BH mass and Eddington ratio, and we observed them with the X-Shooter instrument on the VLT, covering the rest wavelength range ~ 1200 to 9800 \AA . This wide wavelength range allows us to study, simultaneously, more emission lines (i.e., CIV 1550 \AA through H-alpha), and a larger portion of the global AGN SED, than any previous studies. We currently have a sample of 30 quasars already observed and spanning BH masses from $\sim 10^8$ to $10^9 M_{\text{Solar}}$ and Eddington ratio from ~ 0.03 to 0.7 . We focus here on our first science goal, comparing the observed AGN SED to thin accretion disk models in order to identify the origin of the SED. We also discuss the unique capability of this sample to identify any emission-line profile dependencies on BH mass and the Eddington ratio, and to compare mass determination methods based on four different emission-line profiles ($H\alpha$, $H\beta$, MgII 2800 \AA , and CIV 1550 \AA).

Keywords

- quasars: general;
- accretion;
- accretion disks