

The phylogeny of quasars and the ontogeny of their central black holes

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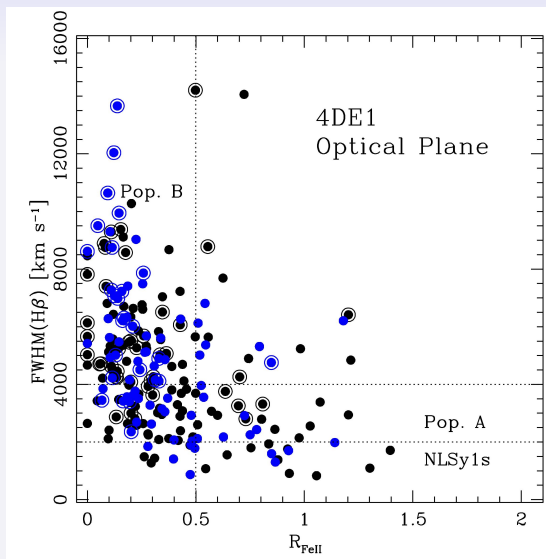
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The Quasar Main Sequence in the 4D eigenvector 1 context



Our 215 quasar sample. Blue dots: 85 quasars. Circled dots: radio louds.

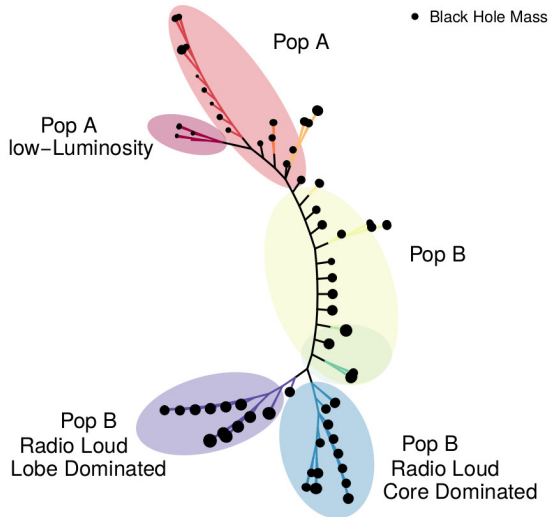
Cladistic analysis of 85 low- z quasars ($z \lesssim 0.7$)

- $R_{\text{FeII}} = I(\text{FeII}\lambda 4570) / I(\text{H}\beta)$
- $\text{FWHM}(\text{H}\beta)$
- **the soft X-ray photon index**
- the radial **velocity centroid displacement** of $\text{CIV}\lambda 1549$ at half maximum
- the bolometric luminosity L_{bol}
- radio loudness parameter RK
- the line centroid displacement of $\text{H}\beta$ at quarter maximum
- the peak shift of $[\text{OIII}]\lambda 5007$
- the rest-frame EW of OIII
- the rest-frame EW of $\text{CIV}\lambda 1549$
- $(M_{\text{BH}}$

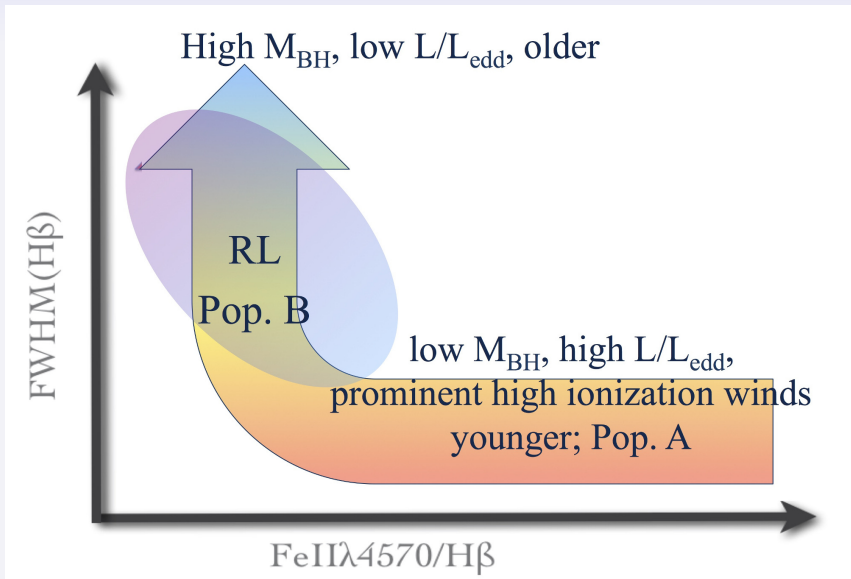
→ The 4DE1 parameters

estimated from $\text{H}\beta$ FWHM)

The cladogram: an **observed** evolutionary scenario



The observed evolutionary track in the 4ED1 plane



Property evolutions

