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The disk-corona interplay in radiatively-efficient broad-line AGN

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Through the years, AGN accretion theory has lagged behind with respect to the plethora of observational signatures driven by accretion onto supermassive black holes. For instance, the smoking gun of the disk-corona interplay in radiatively-efficient AGN is given by the correlation observed between monochromatic $\log L_X - \log L_{UV}$. Despite being used for decades (since the introduction of the more-known α_{ox} parameter, Tananbaum et al. 1979), and for many applications (even for cosmology, e.g. Risaliti & Lusso 2018), it still lacks a conclusive theoretical explanation.

We tested our disk-corona model (Merloni 2003; Arcodia+ in subm.) against the observed $\log L_X - \log L_{UV}$. The observed slope, being smaller than one, indicates that going from lowly- to highly-accreting AGN the corona emission increases less than the disk emission, with crucial implications for the accretion physics governing the system. Our model can predict this key ingredient in terms of modified viscosity prescriptions in the flow, inherently yielding a corona that becomes comparably weaker than the disk for increasing accretion rates. We also put forward a more quantitative observational test using a reference sample of broad-line AGN and modeling every single source in the $L_X - L_{UV}$ plane, to have an in-depth understanding of the physics driving the slope, normalization and intrinsic scatter of one of the most used AGN X-ray to UV observables.

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

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