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Dissecting black hole-galaxy co-evolution from de-biased scaling relations

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It has been claimed for decades that almost all galaxies in the local Universe host at their centre a super-massive black hole (SMBH) the mass of which appears to be tightly correlated with the stellar mass and the random motion ("velocity dispersion", sigma) of the stars of the host galaxy. In this talk I will first highlight that significant biases affect local black hole-galaxy correlations. I will specifically show that the majority of quiescent early-type galaxies with central black hole mass estimates have significantly higher velocity dispersions than local unbiased galaxies of similar stellar mass. Through aimed Monte-Carlo simulations, residual analysis, and the comparison with latest AGN clustering measurements, I will then illustrate that present data sets of active and quiescent galaxies strongly favour on average lower SMBH masses than previously thought, and point to velocity dispersion as more "fundamental" than galaxy stellar mass, galaxy size or Sersic index. I will then move on discussing the main implications of these findings, in particular: 1) The implied black hole radiative efficiencies and obscured fractions; 2) the consequences on feedback from active black holes and SMBH binary gravitational waves; 3) the connection to cosmological models that rely on velocity dispersion, rather than stellar mass, as main driver of black hole growth.

Topic

Active Galactic Nuclei: accretion physics and evolution across cosmic time

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