

Probing the Genesis of Supermassive Black Holes: Emerging Perspectives from JWST and Expectation toward New Wide-Field Survey Observations

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The Age of Discovery with the JWST: Excavating the Signatures of the First Massive Black Holes

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The James Webb Space Telescope (JWST) observations have revolutionized extragalactic research, particularly with the discovery of low-luminosity active galactic nuclei (AGNs) at high redshifts, powered by accreting black holes (BHs) with masses of 10^{6-8} Msun. These AGN populations are crucial for understanding early BH assembly and coevolution with their host galaxies. Several remarkable findings distinguish these JWST-identified AGNs from their low-redshift counterparts: (1) their abundance is 1-2 orders of magnitude higher than that of bright quasars, (2) the BH-to-galaxy mass ratio appears significantly higher than the local relationship, and (3) strong absorption features are often seen on top of Balmer emission lines. In this talk, I will review these new results from the first-round of JWST observations, explore theoretical explanations and predictions for those aspects, and propose potentially interesting observations to further investigate the early BH population.

Presenter: INAYOSHI, Kohei (Peking University)