

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

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Origin of LRDs and signatures of AGN activity

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The advent of the James Webb Space Telescope (JWST) has revealed a wealth of new galaxies, among which are 'little red dots' (LRDs) at $z \sim 4 - 11$, a population of previously-hidden, dust-obscured active galactic nuclei (AGNs) powered by $10^6 - 10^8 M_\odot$ black holes (BHs). In this talk, I will discuss results from 3D cosmological simulation which show that black holes of $10^3 - 10^5$ solar masses can form in atomically cooling halos. They can be the potential origin of the AGNs discovered at high redshifts in the JWST JADES, CEERS and UNCOVER surveys. Furthermore, I will show the estimate of radio fluxes for LRDs and discuss the possibility of their detection with radio observatories such as VLA, SKA and ngVLA. The detection of a few hundred nJy radio signal at frequencies > 2 GHz will be a smoking gun for the presence of AGN in LRDs.

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