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Broad-Line AGN at 3.5 < z < 6: The Black Hole Mass Function and a Connection with Little Red Dots

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Observational constraints on the evolution of active galactic nuclei (AGN) are key for constraining the origins and evolution of supermassive black holes (BHs) across cosmic time. In this talk, I present a sample of 50 H-alpha detected broad-line AGN (BLAGN) at redshifts 3.5<z<6.8 using data from the CEERS and RUBIES JWST/NIRSpec Surveys. I compute rest-frame ultraviolet and optical spectral slopes for these objects, and determine that 10 BLAGN in our sample are also little red dots (LRDs). I discuss the overlap and connections between the LRDs and BLAGN. I next construct the BH mass function at 3.5<z<6. This BH mass function shows broad agreement with both recent JWST observations as well as theoretical models, indicating that the observed abundance of BHs in the early universe is not discrepant with physically-motivated predictions. This BH mass function is largely featureless, and resembles a power-law. This may indicate that any signature from black-hole seeding has been lost by redshift z~6. I compute the BLAGN UV luminosity function and find good agreement with JWST-detected BLAGN samples from recent works, finding that BLAGN hosts constitute <10% of the total observed UV luminosity at all but the brightest luminosities. Finally, I discuss future plans to better expand and refine the BH mass function at redshift 3-9 using current, planned, and proposed data from JWST.

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