

X19a JWST Exploration of Early Growth History of Supermassive Black Holes and Host Galaxies at $z > 6$: First Results

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The HSC-SSP has marked a remarkable success in finding low-luminosity quasars at high redshift. However, the near-infrared sensitivity of ground-based telescopes is not sufficient to investigate the black hole (BH) properties of the quasars with bolometric luminosity less than $L_{\text{bol}} \sim 10^{46}$ erg s⁻¹. Also, the properties of quasar host galaxies have only been measured through the cold interstellar medium with ALMA. In this talk, we present first results from a JWST Cycle 1 GO program to observe 12 of the lowest-luminosity HSC quasars at $z = 6$ with NIRC*am* imaging and NIRS*pec* spectroscopy. From observations of the first two targets, we detect extended emission surrounding the central quasars in NIRC*am* images based on our 2D image-modeling technique. These are the first detections of starlight from quasar host galaxies within the first billion years of the universe. NIRS*pec* spectra of the same targets show a variety of broad emission lines in the rest-optical wavelengths, from which one can extract the properties of the central BHs. We discuss the host and BH properties in the context of the build-up of galaxy-BH co-evolution. Those early results demonstrate the power of the JWST in the study of representative quasar populations in the distant universe.