The First Black Holes with Kilometer Baseline Interferometry

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Abstract

Supermassive black holes (SMBHs) are an essential player in the evolution of the universe from the Big Bang, to reionization, cosmic noon, and today. Understanding the physics of their growth and the nature of their seeds are key open questions in astronomy. JWST has opened a window to the early universe and is providing a discovery space for the first black holes in the early universe including the interesting Little Red Dots and other large scale surveys (Euclid, Roman, LSST) will increase the samples. In this talk, I will outline how a large, kilometer baseline array in the optical and infrared would allow for detailed studies of the physics of the gas around early SMBHs, highly accurate measurements of the mass which constrain seeding models, and potentially resolving the stellar and star-forming light from the (proto-)galaxies they live in. These exciting prospects will then be translated into the technical requirements for a next generation interferometer.

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