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A unique probe of dark matter in the core of M87 with the Event Horizon Telescope

Thursday, April 27, 2017 3:30 PM (15 minutes)

In this presentation, I will demonstrate the unprecedented capabilities of the Event Horizon Telescope (EHT) to image the innermost dark matter profile in the vicinity of the supermassive black hole at the center of the M87 radio galaxy. I will present the first model of the synchrotron emission induced by dark matter annihilations from a spiky profile in the close vicinity of a supermassive black hole, accounting for strong gravitational lensing effects. I will show that the photon ring surrounding the silhouette of the black hole is enhanced in the presence of a dark matter spike, which introduces observable small-scale structure into the signal. This will lead me to the observational constraints on dark matter we obtain from EHT data. More specifically, I will discuss how current EHT data constrain very weakly annihilating dark matter, and how future EHT observations will further constrain the DM scenario.

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Session Classification: Afternoon session