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Beyond the one ring: probing spacetimes with high-resolution mm-VLBI

Thursday, 8 July 2021 16:30 (30 minutes)

With the advent of the Event Horizon Telescope, the study of multiply lensed images of emitting material about black holes has become a reality. The direct detection of a bright, ring-like structure in horizon-resolving images of M87* is a striking validation of general relativity. However, this success raises a singular difficulty: the angular size and shape of these rings are potentially degenerate with the details of the emission region. On the other hand, this presents unique opportunities. I will discuss the benefits of resolving multiple photon rings, corresponding to multiple instances of the secondary image (n=1) across many days or secondary and tertiary images (n=1 and 2) on a single day. Both schemes present opportunities to disentangle gravitational and astrophysical properties, enabling unambiguous measurements of mass, spin, and even tests of GR.

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