

Black Hole Shadow as a Probe to Fundamental Aspects of Gravity

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Abstract: With the developments of observing technology, testing spacetimes under strong gravitational fields, such as the vicinity of black holes, using their shadow images is likely to be attainable and popular in the near future. In this talk, I will introduce the possibility of testing two specific Kerr-like spacetimes using, in particular, the apparent size of the M87* shadows. The first Kerr-like model is constructed from a theory-agnostic approach and it is characterized by the breaking of its Z_2 symmetry in the presence of spins. Such a spacetime could be a good approximation to general black hole solutions in effective low-energy theories of a fundamental quantum theory of gravity. The second model can be regarded as an effective rotating black hole spacetime in loop quantum gravity. This spacetime is everywhere-regular and it has several nice properties. The features of the black hole shadows of these models, as well as their observational implications will be discussed.