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Synthetic observables from simulations of black-hole magnetospheres

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GRMHD simulations have been very successful in interpreting observations from M87*. However, they are unable to account for several important features, such as the plasma loading of the jet or the details of non-thermal radiation, from first principles. Kinetic simulations, on the other hand, are well suited to the task. In this talk, I will review what we have learned from these kinetic simulations. Including radiative processes allows modeling plasma supply realistically, proving that the Blandford-Znajek mechanism can be activated self-consistently. I will also highlight the role of current sheets in the extraction and conversion of energy from the black hole. Finally, I will put the emphasis on extracting synthetic observables from these simulations, such as gamma-ray lightcurves and millimeter images. That allows us to model accurately the non-thermal radiation emitted from the innermost regions of black-hole magnetospheres, which can be directly compared to the EHT observations, for example.

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