

Abstract Submitted
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Dark matter distributions around massive black holes: A fully general relativistic approach¹ FRANCESC FERRER, LALEH SADEGHIAN, Washington University, St. Louis, CLIFFORD WILL, University of Florida — The cold dark matter at the center of a galaxy will be redistributed by the presence of a massive black hole. The redistribution may be determined by beginning with a model distribution function for the dark matter, and “growing” the black hole adiabatically, holding the adiabatic invariants of the motion constant. Unlike previous approaches, which adopted Newtonian theory together with ad hoc correction factors to mimic general relativistic effects, we carry out the calculation fully relativistically, using the exact Schwarzschild geometry of the black hole. We consider a range of initial distribution functions, including “cuspy” profiles, and find that the density spike very close to the black hole is significantly higher than that found previously by Newtonian analyses. The potential implications for detection of signals from galactic center dark matter will be discussed.

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