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Self-force on Accelerated Particles in Schwarzschild THOMAS LINZ, ERIC VAN OEVEREN, ALAN WISEMAN, University of Wisconsin, Milwaukee — In this work we extend the techniques of Hikida et. al. (2005) and calculate the scalar self-force on particles moving along accelerated circular orbits in Schwarzschild. By reformulating the earlier analytic methods for solving the Teukolsky equation (Mano, Suzuki, and Takasugi, 1996), Hikida demonstrated some useful features of the solutions which simplify self-force calculations, and then utilized these techniques to produce a low frequency expansion of the scalar self-force on a particle undergoing geodesic, circular motion in Schwarzschild spacetime. We further expand on these techniques by allowing the particle to move along circular orbits with an arbitrary orbital frequency. By relaxing the restriction to geodesic motion, we are able to both compare the results with a wider range of simpler examples and distinguish the effects on the self-force from the background curvature of the spacetime and from the particle's motion. These methods may lead to further insights regarding the self-force regularization.

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