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Self-consistent waveforms from a scalar charge in orbit around a Schwarzschild black hole PETER DIENER, Louisiana State University, IAN VEGA, University of Guelph, BARRY WARDELL, University College Dublin, STEVEN DETWEILER, University of Florida — Extreme Mass Ratio In-spirals of compact objects into super massive black holes are expected to be a very important source of gravitational waves for future space based gravitational wave detectors. For the detection and analysis of gravitational waves from such events, it is necessary to know the waveforms to exquisite precision. Here we report on recent progress on using the effective source approach to the self-force problem to perform self-consistent evolutions of a scalar charge in orbit around a Schwarzschild black hole. The effective source approach allow us to cheaply extract the self-force acting on the scalar charge at every timestep and thereby evolve both the scalar field produced by the particle and the orbit of the particle at the same time in a self-consistent manner. We present the first waveforms generated using this method.

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