Abstract Submitted
for the APR10 Meeting of
The American Physical Society

Gravitational self-force meets the post-Newtonian approximation in extreme-mass ratio inspiral of binary black holes STEVEN DETWEILER, University of Florida — Post-Newtonian analysis, numerical relativity and, now, perturbation-based gravitational self-force analysis are all being used to describe various aspects of black hole binary systems. Recent comparisons between self-force analysis, with $m_1 \ll m_2$, and post-Newtonian analysis, with $v/c \ll 1$ show excellent agreement in their common domain of validity. This lends credence to the two very different regularization procedures which are invoked in these approximations. When self-force analysis is able to create gravitational waveforms from extreme mass-ratio inspiral, then unprecedented cross cultural comparisons of these three distinct approaches to understanding gravitational waves will reveal the strengths and weaknesses of each.

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Date submitted: 23 Oct 2009   Electronic form version 1.4