Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

The Angular Momentum Flux in the Scalar Self-Force Problem
SAMUEL CUPP, Austin Peay State University, PETER DIENER, Louisiana State University — The scalar self-force problem consists of a scalar point charge orbiting a supermassive black hole. The object is small enough that the perturbation of space-time due to its mass is inconsequential, and the only forces are gravity and the self-force. The self-force is a force on the inspiraling particle that results from the back-scattering of the object's own field off of curved space-time. I derived an accurate calculation of the angular momentum flux for the scalar self-force problem and implemented it into a preexisting (3 spatial +1 time) dimensional code. We then compared our results to very precise frequency domain calculations. The angular momentum flux calculations yield results that converge to the actual value of 0.0124682173 M. However, the calculations currently converge at about .7 order, and the reasons for this extremely slow convergence is currently unknown.

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Date submitted: 08 Nov 2012 Electronic form version 1.4