Abstract Submitted
for the APR13 Meeting of
The American Physical Society

Spin-dependent post-Newtonian parameters from EMRI computation in Kerr background[1] JOHN FRIEDMAN, Department of Physics, University of Wisconsin-Milwaukee, ALEXANDRE LE TIEC, Maryland Center for Fundamental Physics & Joint Space-Science Institute, Department of Physics, University of Maryland, University of Maryland, ABHAY SHAH, Dept of Particle Physics & Astrophysics, Weizmann Institute of Science, Rehovot 76100, Israel — Because the extreme mass-ratio inspiral (EMRI) approximation is accurate to all orders in v/c, it can be used to find high order post-Newtonian parameters that are not yet analytically accessible. We report here on progress in computing spin-dependent, conservative, post-Newtonian parameters from a radiation-gauge computation for a particle in circular orbit in a family of Kerr geometries. For a particle with 4-velocity $u^\alpha = Uk^\alpha$, with k^α the helical Killing vector of the perturbed spacetime, the renormalized perturbation ΔU, when written as a function of the particle's angular velocity, is invariant under gauge transformations generated by helically symmetric vectors. The EMRI computations are done in a modified radiation gauge. Extracted parameters are compared to previously known and newly computed spin-dependent post-Newtonian terms. This work is modeled on earlier computations by Blanchet, Detweiler, Le Tiec and Whiting of spin-independent terms for a particle in circular orbit in a Schwarzschild geometry.

[1]This work was supported in part by NSF Grant PHY 1001515 and by European Research Council Starting Grant No. 202996.

John Friedman
University of Wisconsin-Milwaukee

Date submitted: 15 Jan 2013 Electronic form version 1.4