Abstract Submitted
for the APR13 Meeting of
The American Physical Society

Compact binaries in scalar-tensor gravity: Equations of motion and gravitational radiation to high post-Newtonian order RYAN LANG, SAEED MIRSHEKARI, CLIFFORD WILL, University of Florida — We calculate the equations of motion and gravitational wave emission from binary systems containing neutron stars or black holes in a class of general massless scalar-tensor theories of gravity to high orders in the post-Newtonian (PN) approximation. The strong internal gravity of the bodies is taken into account by letting the mass of each body depend on the value of the scalar field. We present results for the equations of motion through 2.5PN order and show that the equations for binary black holes are observationally identical to those in general relativity. For mixed neutron-star-black-hole systems, the deviations from general relativity depend on a single parameter which is a function of the scalar-tensor coupling constant and the sensitivity of the neutron star's mass to variations in the scalar field. We also report on progress toward determining the gravitational waveform and the energy flux through 2PN order.

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Date submitted: 11 Jan 2013 Electronic form version 1.4