**Inspiralling compact binaries in scalar-tensor theories of gravity: Equations of motion to 2.5 post-Newtonian order** SAEED MIRSHEKARI, Washington University in St. Louis, NICOLAS YUNES, Massachusetts Institute of Technology, CLIFFORD WILL, Washington University in St. Louis — Gravitational waves from inspiralling compact binaries will provide tests of alternative theories of gravity, such as the general class of scalar-tensor theories. We derive the scalar-tensor equations of motion for non-spinning compact objects, including black holes and neutron stars, to order $(v/c)^5$ beyond Newtonian order. We use the DIRE (Direct Integration of the Relaxed Einstein Equations) formalism [1] adapted to scalar- tensor theory, coupled with Eardley's scheme [2] for incorporating compact, quasi- stationary, self-gravitating bodies. Preliminary results will be reported. Supported in part by the NSF, PHY 06-52448 and 09-65133.

[1] A. G. Wiseman and C. M. Will, Phys. Rev. D 54, 4813 (1996); M. E. Pati and C. M. Will, Phys. Rev. D 62, 124015 (2000); ibid. 65, 104008 (2002).
[2] D. M. Eardley, Astrophys. J. Lett. 196, L59 (1975).

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