

Abstract Submitted
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Gravitational radiation reaction for inspiralling binaries - spin-spin effects to 3.5 post-Newtonian order¹ HAN WANG, CLIFFORD M. WILL, Washington University in St.Louis — Spin may play an important role in the inspiral of compact binary systems and may have observable effects on the gravitational wave signal emitted. Using post-Newtonian equations of motion for fluid bodies that include radiation-reaction terms at 2.5 and 3.5 post-Newtonian (PN) order ($O[(v/c)^5]$ and $O[(v/c)^7]$ beyond Newtonian order), we derive the equations of motion for binary systems with spinning bodies, including spin-spin effects. In particular we determine the effects of radiation-reaction coupled to spin-spin effects on the two-body equations of motion, and on the evolution of the spins. We find that not like the spin-orbit coupling, which has no effect on spin at this order, there is a 3.5PN order spin-spin induced precession to the individual spin. Using the equations of motion and the spin precession, we verify that the loss of total energy and total angular momentum induced by spin-spin effects precisely balances the radiative flux of those quantities calculated by Kidder et al.

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