

Evolution of highly eccentric binary orbits with radiation reaction

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To date, gravitational wave detections have been limited to those from quasi-circular binary mergers. However, a significant percentage of mergers could have measurable residual eccentricities because of either external perturbations of the system or short timescales between formation and merger of the binary. Understanding how the orbits of such binaries evolve could aid in creating eccentric gravitational waveform templates as well as provide astrophysical information about the environment and formation channels of these systems. We have analyzed the long-term evolution of highly eccentric binaries together with a relativistic criterion for capture, focussing on gravitational radiation reaction to high post-Newtonian orders. We will report on the current status of this work.

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