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Dynamics of compact binaries at the fourth post-Newtonian approximation

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Coalescing compact binary systems are among the most promising sources of gravitational waves for the next generations of interferometers. Due to the faintness of the signal, one needs to construct highly accurate templates to be match-filtered against the detector data, for both detection and parameter estimation. During the inspiralling phase of the coalescence, when the two objects are widely separated, the post-Newtonian (PN) formalism allows one to describe the dynamics of the binary and to compute the radiation energy flux, from which the orbital phase evolution can be derived. In this talk, I will present the equations of motion of non-spinning compact binary systems derived at 4PN in harmonic coordinates. In particular I will detail the formalism based on a Fokker action, including the treatment of the so-called tail effects which appear at 4PN.

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