

# Post-Newtonian gravitational waveforms in scalar-tensor theories: elliptic and hyperbolic orbits

*Wednesday 9 April 2025 16:50 (2 minutes)*

In this talk, I will present recent work on gravitational waves generated by compact binaries in a class of scalar tensor theories within the post-Newtonian (PN) approximation. I will briefly review the waveform generation formalism in these theories and waveforms for circular orbits. I will then discuss recent work on extending these waveforms to elliptic and hyperbolic orbits. I will first discuss how to construct the 2PN-accurate quasi-Keplerian parametrization, which explicitly solves the equations of motion at that order, both in the elliptic and hyperbolic case. In the case of elliptic orbits, I will detail how I obtained the amplitude at subleading post-Newtonian order and the fluxes of energy and angular momentum at 1.5PN (i.e. 2.5PN beyond the leading dipolar radiation), which finally lead to the secular evolution of the orbital elements at the corresponding order. I will in particular discuss subtleties in the treatment of hereditary terms (such as the tails, the memory and center-of-mass frame issues). Finally, I will discuss ongoing work concerning gravitational radiation for hyperbolic encounters, which leads to the completion of the dissipative contributions to the 3PN scattering angle.

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**Session Classification:** Flash talks

**Track Classification:** Gravitational waves