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Effective-one-body, Post-Minkowskian and Numerical Relativity

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Detection and analysis or gravitational wave signals rely on fast and accurate theoretical models. In particular, the effective-one-body (EOB) framework proved very fruitful in bridging the gap between analytical (approximated) solutions of Einstein's equations and numerical relativity (NR) information.

The improved sensitivity of interferometers will allow for detection of different gravitational wave signatures, such as waves generated by eccentric and scattering binary systems. Analytical advances in post-Minkowskian (PM) computations, borrowing quantum-field theory techniques, provide us new tools to approach the modelization of such systems.

We will present recent advances both in NR scattering simulations and analytical PM computations, and show how resummations through the EOB approach prove crucial in improving the agreement between analytical and numerical results. We also show analytical techniques able to deal with the increasing complexity of perturbative results.

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