ID de Contribution: **12**   Type: **Non spécifié**

Gravitational binary dynamics from quantum scattering amplitudes

mardi 26 avril 2022 11:45 (25 minutes)

Recent advances in the scattering amplitude-based approach to the Post-Minkowskian expansion of classical general relativity have demonstrated that this new approach holds the promise of significantly changing the efficiency of computations in general relativity. This approach completes the post-Newtonian computations by providing information beyond its regime of validity. This framework leads to surprising results connecting the conservative part and gravitational radiation effects. As well, the scattering amplitude methods apply to a wide range of effective field theories in various dimensions.

In this talk, we will present new results for the post-Minkowskian expansion in various dimensions. We will present a new organisation of the scattering amplitudes for an efficient evaluation of the classical post-Minkowskian contributions to high-loop order. We will discuss a reformulation of the effective-one-body formalism for connecting the scattering amplitudes to the effective classical hamiltonian of the two-body systems and gives applications to probe regime results and the high-energy limit in various dimensions.

Type of contribution

Contributed Talk only

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Classification de Session: Contributed talks

Classification de thématique: Contributed talks