

We present a catalogue of hybrid waveforms that connect multiple spherical harmonic modes of inspiral waveforms based on the post-Newtonian and effective-one-body descriptions with results from numerical relativity simulations available in the literature and produced by our group.

We discuss our new numerical relativity simulations and their accuracy, data quality studies of both numerical and hybrid waveforms, comparisons with post-Newtonian results, and the importance of an automated determination of tetrad conventions.

A compact and accurate representation of the data set in terms of a phenomenological model is presented, as well as numerical fits related to various quantities of interest, such as recoil velocities, parameters characterizing the peak of the spherical harmonic modes, and the frequency of transition from inspiral to merger.