Merging of spinning binary black holes in globular clusters

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Currently over 50 gravitational events from compact binaries were reported by LIGO-Virgo consortium. We see Gravitational Waves (GW) as a new and very powerful informational channel. The current GW observations contain the Binary Black Hole (BH) systems key orbital parameters, such as mass, semi-major axis, eccentricity and even the possible spins of the BH's. The next 3G generation of ground-based observatories (Einstein Telescope, Cosmic Explorer) will have the opportunity to work with GWs during multiple cycles. It can significantly improve the estimations of individual components parameters of BH's. Based on our current high resolution direct N-body modelling of the Milky Way typical Star Cluster systems dynamical evolution we try to numerically estimate the influence of individual spins values, orientations and orbital eccentricities on GW waveforms and observed time-frequency maps during multiple cycles for BH binary mergers. In our, up to date, N-body dynamical simulations we use the high order relativistic post-Newtonian corrections for the BH binary particles (3.5 post-Newtonian (PN) terms including spin-spin and spin-orbit terms). In the current work we present the GW waveforms catalogue which covers the large parameter space in mass ratios 0.05 - 0.82 and extreme possible individual spin cases.

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