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**Long and highly accurate eccentric binary black hole simulations with SpEC** ANTONI RAMOS-BUADES, Real Sociedad Espanola de Fisica, HANNES RUETER, HARALD PFEIFFER, Deutsche Physikalische Gesellschaft — Generic binary black hole (BBH) mergers may occur in elliptical orbits with non-zero eccentricity. The waveform models used by the LIGO and Virgo collaboration so far to detect and estimate parameters of gravitational wave (GW) signals are based on the assumption of quasicircular orbits. In the recent years there has been an increasing effort from the GW community to model eccentric BBHs. The first step required to model such systems is the generation of a data set of eccentric numerical relativity (NR) simulations which can be used to calibrate and validate the eccentric waveform models, and test data analysis implications for such waveforms. First, the state of art of the current eccentric NR data sets will be reviewed. Next, we will show the adaption of the spectral NR code, SpEC, to produce a set of long and highly accurate eccentric nonspinning NR simulations from mass ratio 1 to 10. The accuracy of these new waveforms is assessed by showing convergence tests and computing the unfaithfulness between waveforms at different resolutions. Finally, we briefly show possible applications of these longer and more accurate waveforms to waveform modelling or data analysis studies, like parameter estimation or searches.

Antoni Ramos-Buades  
Real Sociedad Espanola de Fisica

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