



Contribution ID: 941

Type: **Talk in the parallel session**

A new waveform model for eccentric double white dwarf binaries

Tuesday, July 6, 2021 9:10 AM (20 minutes)

Close white dwarf binaries within our galaxy are promising sources of gravitational wave signals for Laser Interferometer Space Antenna (LISA). While the majority of such systems are expected to have circular orbits, a small portion of those formed through dynamical channels can have significant eccentricities. Analyzing the gravitational wave signals from these systems requires accurate eccentric waveform templates. In this talk, I will describe a new waveform model for eccentric binary white dwarf systems taking tides into account. We propose a semi-analytical “kludge model” which aims to be computed fast while also being sufficiently accurate. This model gives the quadrupole radiation from a post-Keplerian orbit including the post-1-Newtonian effect on point masses as well as the quadrupolar tidal force. We include the effects on orbital evolution due to radiation reaction and tidal friction in the waveform through a Taylor series expansion of the gravitational wave phase and amplitude. I will also describe our ongoing progress in studying the effect of dynamical tides on the waveform model. The model aims to provide accurate and efficient templates to study eccentric double white dwarf binaries with LISA.

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Session Classification: Planning Gravitational Wave Detections form LISA

Track Classification: Gravitational Waves: Planning Gravitational Wave detections form LISA