Abstract Submitted
for the SES21 Meeting of
The American Physical Society

Effects of dynamical tides on gravitational wave signals from eccentric double white dwarf systems[1] SHU YAN LAU, KENT YAGI, PHIL ARRAS, University of Virginia — The tidal response of compact stars in a binary system is a useful probe of the stellar interior. While the equilibrium part of the tide dominates the matter response for systems with a large orbital separation, the dynamical tide starts to become important for small separation as the orbital period gets closer to the matter response time. In this presentation, I will discuss the effect of dynamical tides on the gravitational wave signals from eccentric binary white dwarf systems. These systems are one of the target sources of the proposed space-based gravitational wave detector (LISA). We show numerically that for orbits with high eccentricities and small separations, the dynamical tide can cause a chaotic growth of the normal mode amplitudes and cause the orbit to evolve in a random manner, leading to a chaotic waveform. Meanwhile, for systems with lower eccentricities and larger separations, the dynamical tide affects the orbit slightly by introducing extra dependence on the normal mode frequencies. This causes slight amplitude modulations of the gravitational wave emitted, which implies that normal mode oscillations can potentially be detected with the inspiral signal.

[1]NASA Grant 80NSSC20K0523

Shu Yan Lau
University of Virginia

Date submitted: 07 Oct 2021 Electronic form version 1.4