Abstract Submitted
for the APR20 Meeting of
The American Physical Society

Detectability of Interfacial Modes of Hybrid Stars with a Solid Core SHU YAN LAU, YAGI KENT, Univ of Virginia — During a binary compact star coalescence, the tidal effect is encoded in the phase of the emitted gravitational wave signal. The tides contain unique information to constrain the equation of state (EOS) of cold high-density matter. While the equilibrium tidal effect can be described by the tidal deformability, the dynamical part could arise from the resonant excitations of non-radial pulsation modes which depend on the detailed features of the stellar internal structures. Out of the many pulsation modes, we focus on the interfacial mode of hybrid stars with a crystalline quark matter core and fluid nuclear matter envelope. This mode originates from the discontinuities in density and shear modulus at the interface separating the quark matter and nuclear matter phase. It is of interest due to its relatively large overlap integral with the external tidal field, which implies a significant excitation amplitude, and its resonant frequency might lie within the sensitive region of ground-based gravitational wave detectors depending on the EOS. In this talk, I will present how the interfacial mode affects the waveform of a binary hybrid star coalescence and comment on its detectability with advanced LIGO and next-generation detectors based on a Fisher analysis.

Shu Yan Lau
Univ of Virginia

Date submitted: 04 Jan 2020 Electronic form version 1.4