

Abstract Submitted  
for the APR20 Meeting of  
The American Physical Society

**Piecewise Polytrope Parameterization for Neutron Star Equation of State** JOSEPH LUCACCIONI, Kenyon Coll — With an average mass of 1.4 times that of the sun, yet with only an average radius of 10 kilometers, neutron stars are highly dense remains of dead stars. Such mass within such a small volume leads neutron stars to take up a form of exotic matter that cannot be replicated in a laboratory. It is possible, however, to probe the neutron star equation of state (an unconstrained relationship between pressure and density for neutron star matter) through gravitational-wave observations of binary neutron star mergers. The LIGO-Virgo network has already detected two such events: GW170817 and GW190425. I have developed software to model the neutron star equation of state as a dynamic piecewise polytrope and started incorporating this software into the LIGO Scientific Collaboration's flagship parameter estimation software package. The finished program will provide another way to measure the neutron star EOS from a gravitational wave observation of colliding neutron stars.

Joseph Lucaccioni  
Kenyon Coll

Date submitted: 12 Jan 2020

Electronic form version 1.4