



Contribution ID: 74

Type: **Invited Talk**

## Equation of State Constraints from Neutron Star Merger Observables

The 2017 binary neutron star merger expanded the astrophysics field to fundamental tests of dense matter and the neutron star equation of state. This event simultaneously signaled the first observationally confirmed host of rapid neutron-capture nucleosynthesis: a process responsible for the creation of about half of the abundance trans-iron elements found in the Solar system, including that of silver, gold, and platinum. While the presence of heavy elements like the precious metals has not yet been definitively confirmed in neutron star merger sites, there nevertheless remains the possibility that mergers are responsible for the majority of other trans-iron elements found in the Galaxy. However, such production of heavy elements likely relies on the neutron star EOS. In this talk, I will discuss the connection between observations the neutron star EOS and heavy elements seen in stars persisting long after merger events. This talk will demonstrate how stellar observations of heavy elements can unexpectedly place constraints on the EOS and how those constraints compare to more direct EOS determinations.

**Primary author:** HOLMBECK, Erika (Lawrence Livermore National Laboratory)

**Session Classification:** MultiMessenger

**Track Classification:** MultiMessenger