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Visualizing Constraints on the Neutron Star Equation of State from Gravitational-Wave Observations BURKE IRWIN, MATTHEW CARNEY, LESLIE WADE, Kenyon College — Constraining the neutron star (NS) equation of state (EOS) is an ongoing project in the gravitational-wave scientific community. An EOS is a relationship between state variables, such as pressure and density, for a material. LIGO and Virgo have recently detected the gravitational-wave signal GW170817, which came from the merger of a binary neutron star system, or a system where two neutron stars are locked in orbit and eventually merge. LIGO and Virgo scientists used a fully-Bayesian software package called LALInference to extract the system's source parameters from the signal. One of these parameters quantifies the tidal deformability of the two-star system, which is directly related to the NS EOS. However, by modeling and parameterizing the NS EOS, this same software package can be used to more directly measure the EOS. In collaboration with Matthew Carney, we have implemented a new method for directly measuring the NS EOS into LALInference and have developed sophisticated visualization tools for turning these outputs into publication-worthy plots. These plots include relationships between the mass and radius of neutron stars and the pressure and density of neutron stars.

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