Abstract Submitted
for the APR21 Meeting of
The American Physical Society

Impact of the neutron-star deformability on equation of state parameters[1] C.Y. TSANG, M.B. TSANG, PAWEL DANIELEWICZ, W.G. LYNCH, Michigan State University, F.J. FATTOYEV, Manhattan College — We use a Bayesian inference analysis to explore the sensitivity of Taylor expansion parameters of the nuclear equation of state (EOS) to the neutron star dimensionless tidal deformability (Λ) on 1 to 2 solar masses neutron stars. A global power law dependence between tidal deformability and compactness parameter (M/R) is verified over this mass region. To avoid superfluous correlations between the expansion parameters, we use a correlation-free EOS model based on a recently published meta-modeling approach. We find that assumptions in the prior distribution strongly influence the constraints on Λ. The Λ constraints obtained from the neutron star merger event GW170817 prefer low values of L_{sym} and K_{sym}, for a canonical neutron star with 1.4 solar mass. For neutron star with mass <1.6 solar mass, L_{sym} and K_{sym} are highly correlated with the tidal deformability. For more massive neutron stars, the tidal deformability is more strongly correlated with higher order Taylor expansion parameters.

[1]This work was partly supported by the US National Science Foundation under Grant PHY-1565546 and by the U.S. Department of Energy (Office of Science) under Grants DE-SC0014530, DE-NA0002923 and DESC001920. All the NS model calculations with High Performance Computers were performed at the Institute for Cyber Enabled Research Center at Michigan State University

Chun Tsang
Michigan State University

Date submitted: 08 Jan 2021 Electronic form version 1.4