

Constraining the parameters of KIDS equation of state inferred from GW170817

Young-Min Kim*, Kyujin Kwak*, Chang-Hwan Lee**, and Chang Ho Hyun***

* Department of Physics, Ulsan National Institute of Science and Technology, Ulsan 44919, Korea

** Department of Physics, Pusan National University, Busan 46241, Korea

*** Department of Physics Education, Daegu University, Gyeongsan 38453, Korea
Email: ymkim715@unist.ac.kr

GW170817 is the first gravitational wave signal from a binary neutron star merger observed by LIGO and Virgo detectors. Right after the GW170817, electromagnetic (EM) counterparts were successfully detected in multi-band observations, from gamma-rays to radio waves (GRB170817A and AT2017gfo). The observation of GW170817 indicates the neutron star is likely to have soft equation of state, while the results from EM counterparts is compatible with stiffer equation of state. In recent results from NICER observation and PREX-II experiment, the stiffer equation of state is preferred as well. In order to understand the inconsistency, we studied the details of physical parameters of a neutron star inferred from GW170817 with KIDS equation of state. In our analysis, we adopted the Bayesian inference for calculating posterior distributions of the KIDS parameters. For the comparison, we calculated the prediction and uncertainty of mass and radius of a neutron star from APR EoS as a baseline. Furthermore, we compared our results with the estimations from pulsar observed by NICER. In conclusion, we discuss the constraint on KIDS parameters from GW170817, and compare it with the results from NICER and PREX-II.

