

GW170817: Measurements of Neutron Star Radii and Equation of State – Supplemental Material

The LIGO Scientific Collaboration and The Virgo Collaboration

Here we present figures that are complementary to those contained in [1]. In particular, the new figures show results that either use or do not use a maximum mass constraint. The results shown here are from analyses performed at the time of writing of [1] and do not contain any new analyses.

Figure 1 is the same as Figure 1 of [1] but also includes the marginalized posterior for the case when using a parametrized EOS and a maximum mass constraint. Figure 2 shows full posteriors for tidal deformability and mass as determined by using a parametrized EOS.

Figure 2 of [1] shows the prior and marginalized posterior for pressure as a function of rest-mass density of the neutron star interior using a parametrized EOS and imposing a lower limit on the maximum mass of $1.97 M_{\odot}$. Figure 3 is the same but without a limit on maximum mass. The left and right panels of Figure 5 are similar to Figure 2 of [1] and Figure 3, respectively, i.e., with and without a maximum mass limit, but with pressure in units of MeV fm^{-3} . Figure 6 shows the upper and lower bounds

on pressure as a function of density for different maximum mass.

The right panel of Figure 3 of [1] shows the marginalized posterior for mass and areal radius of each binary component using a parametrized EOS and imposing a lower limit on the maximum mass of $1.97 M_{\odot}$. Figure 7 is the same but without a limit on maximum mass. Figure 8 shows full posteriors for mass and radius as determined by using a parametrized EOS.

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- [1] B. P. Abbott *et al.* (LIGO Scientific, Virgo), Phys. Rev. Lett. **121**, 161101 (2018), arXiv:1805.11581 [gr-qc].

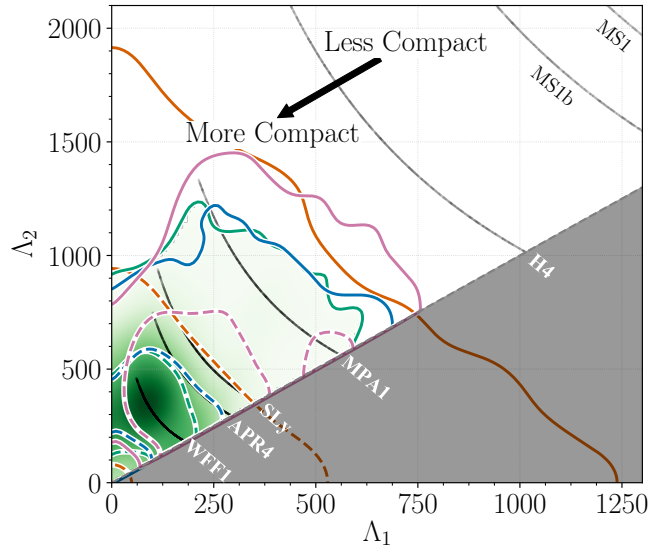


FIG. 1. Same as Figure 1 of [1], i.e., marginalized posterior for the tidal deformabilities of the two binary components of GW170817, as well as the magenta line denoting 50% (dashed) and 90% (solid) credible levels for the posterior obtained using a parametrized EOS with a maximum mass requirement.

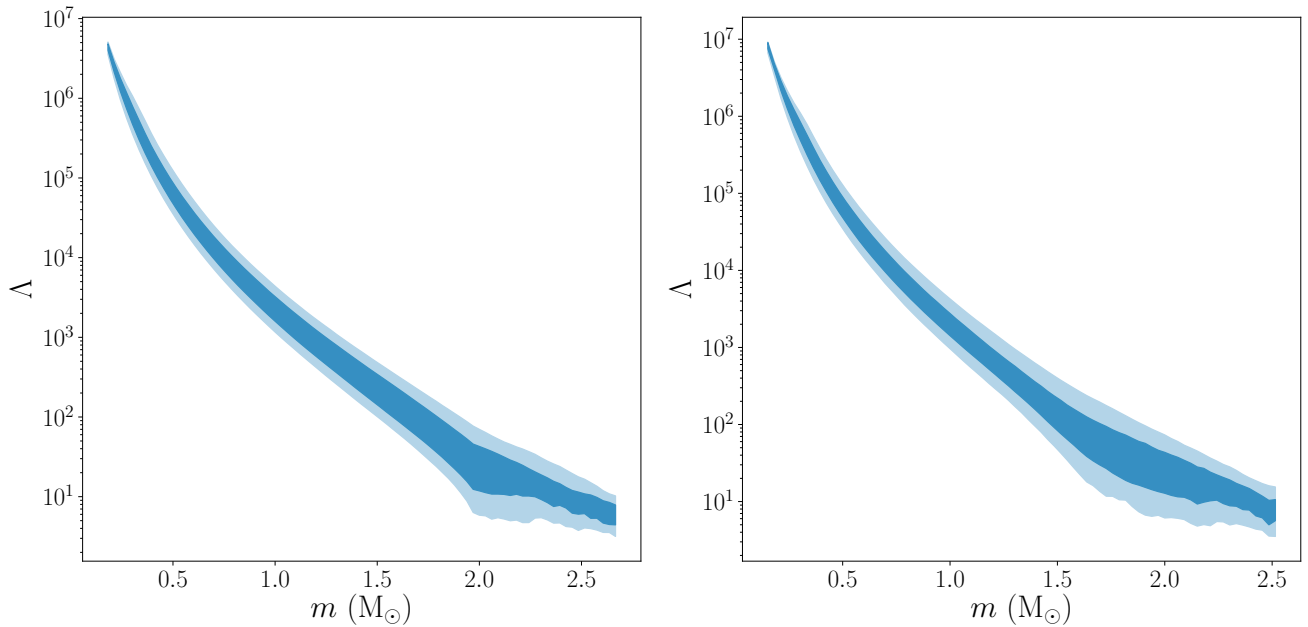


FIG. 2. Full posteriors for tidal deformability and mass using a parametrized EOS with (left) and without (right) a maximum mass constraint. The dark (light) shaded region corresponds to the 50%(90%) posterior credible level.

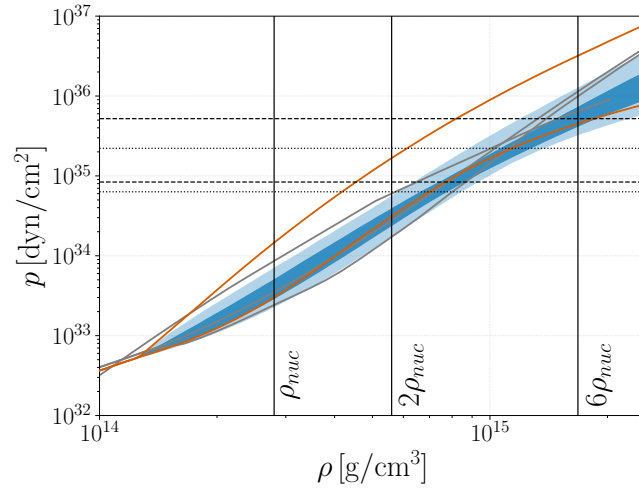


FIG. 3. Same as Figure 2 of [1], i.e., marginalized posterior (blue bands) and prior (orange solid lines) for the pressure as a function of the rest-mass density using a parametrized EOS, but here without a limit on maximum mass. The four horizontal dashed/dotted lines indicate the 90% credible interval for the central pressure of the heavier/lighter binary component.

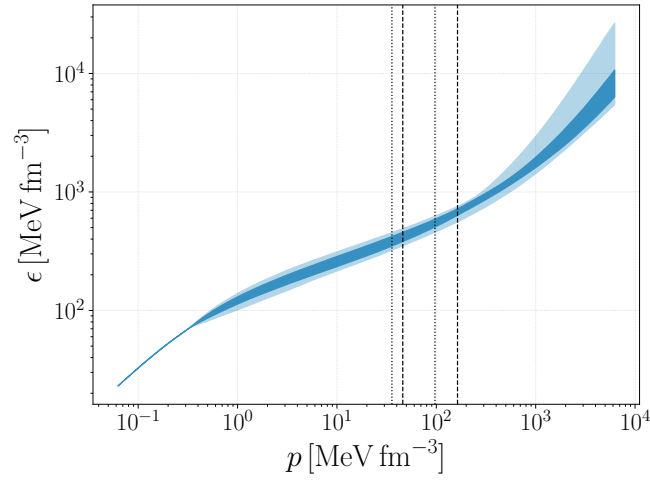


FIG. 4. Similar to Figure 2 of [1] but now we plot the *energy density* (rather than the rest-mass density) with the pressure (here in units of MeV fm^{-3}) with a limit on maximum mass. The four vertical dashed/dotted lines indicate the 90% credible interval for the central pressure of the heavier/lighter binary component.

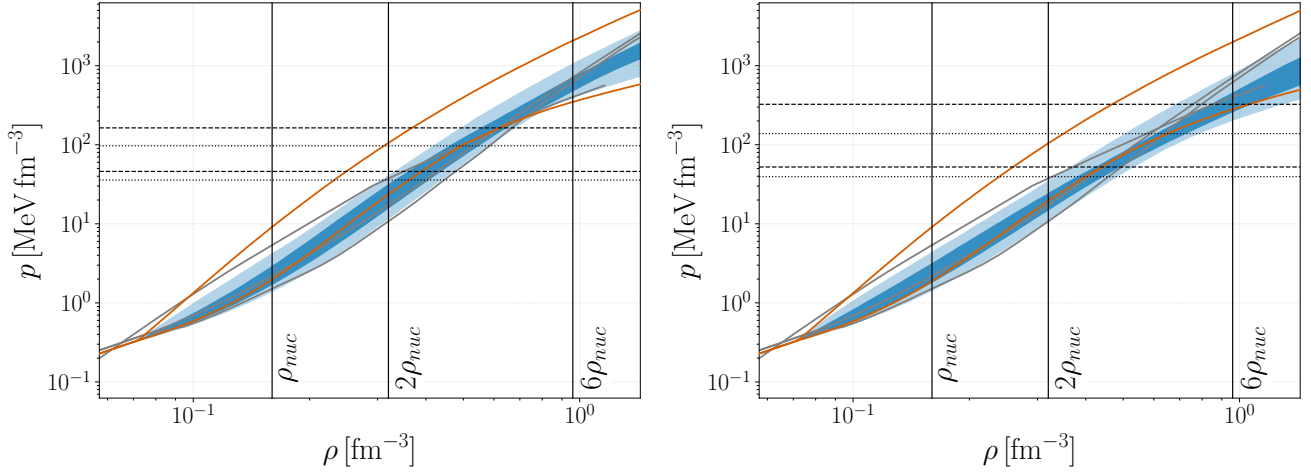


FIG. 5. Left panel is similar to Figure 2 of [1] and right panel is same as Figure 3, i.e., pressure (here in units of MeV fm^{-3}) as a function of rest-mass density with and without a limit on maximum mass. The four horizontal dashed/dotted lines indicate the 90% credible interval for the central pressure of the heavier/lighter binary component.

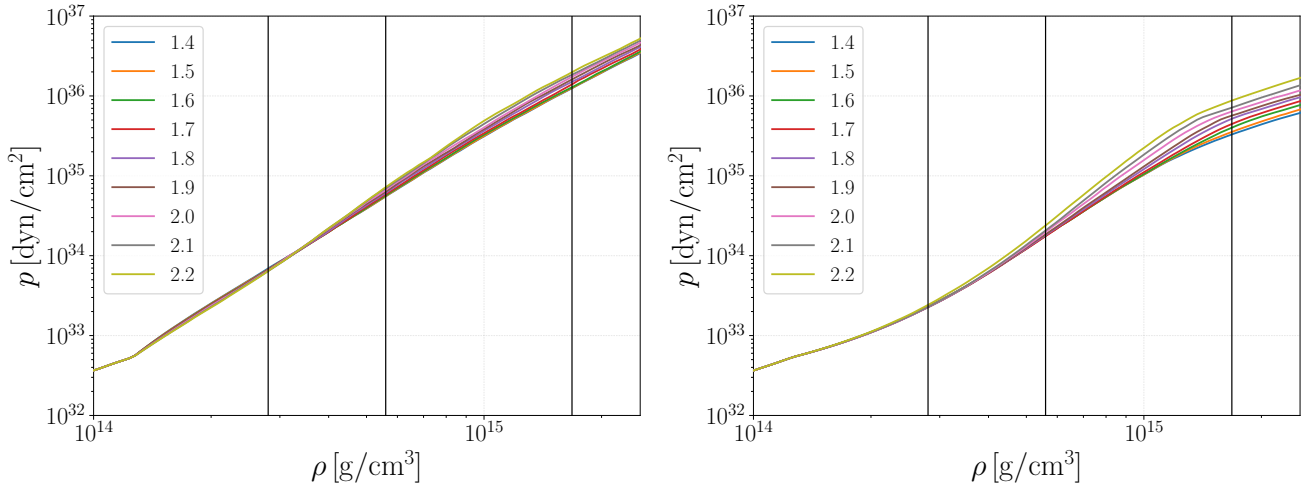


FIG. 6. 90% upper bound (left) and lower bound (right) on pressure as a function of rest-mass density for different values of maximum mass. The four horizontal dashed/dotted lines indicate the 90% credible interval for the central pressure of the heavier/lighter binary component.

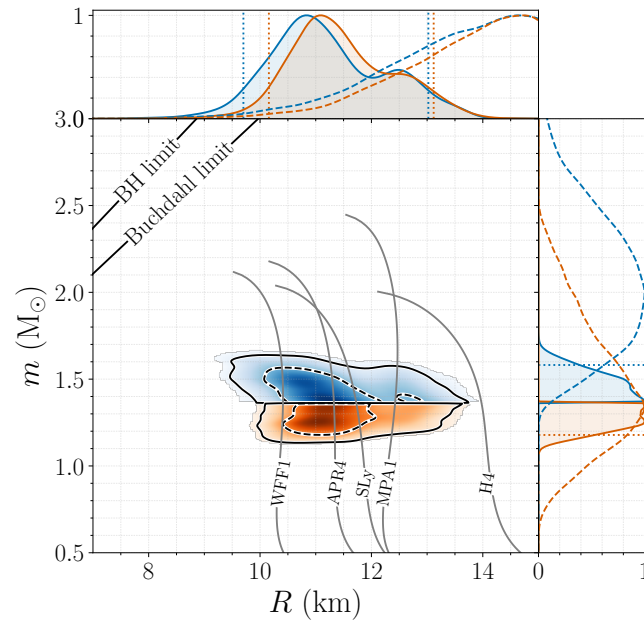


FIG. 7. Same as right panel of Figure 3 of [1], i.e., marginalized posterior for the mass and areal radius using a parametrized EOS, but here without a limit on maximum mass.

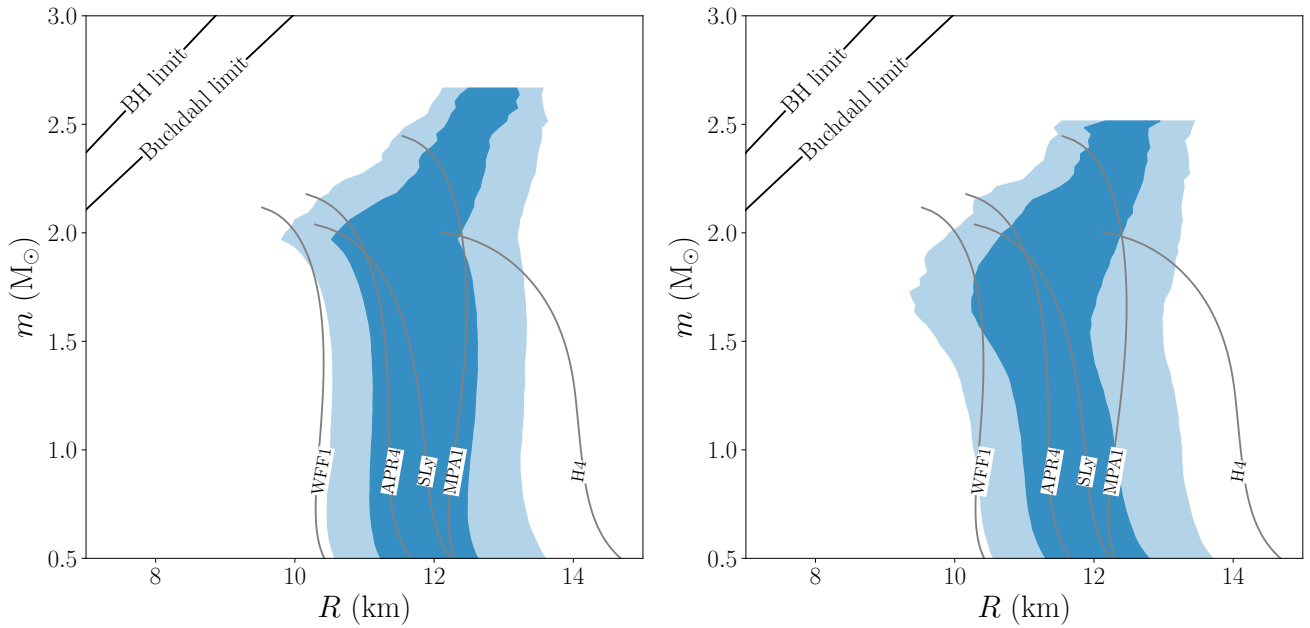


FIG. 8. Full posteriors for mass and radius using a parametrized EOS with (left) and without (right) a maximum mass constraint. The dark (light) shaded region corresponds to the 50% (90%) posterior credible level.