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Neutron stars to finite nuclei : A direct mapping

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The iso-scalar and iso-vector nuclear matter parameters (NMPs) are frequently used to characterise the equations of state (EoSs) that govern the properties of neutron stars (NSs). Recent attempts to relate the radius and tidal deformability of a NS to the individual NMPs have been inconclusive. These properties display strong correlations with the pressure of NS matter which depends on several NMPs. We systematically analyze to isolate the NMPs that predominantly determine the tidal deformability, over a wide range of NS mass. The tidal deformability of the NS with mass 1.2-1.8 M can be determined within 10% directly in terms of four nuclear matter parameters, namely, the incompressibility (K_0) and skewness (Q_0) of symmetric nuclear matter, and the slope (L_0) and curvature parameter ($K_{\text{sym},0}$) of symmetry energy

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