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skins, hypernuclei, and neutron stars"

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The Nuclear Symmetry Energy and the Mass-Radius Relation of Neutron Stars[1]

JAMES LATTIMER, Stony Brook University

The assumptions that i) neutron stars have hadronic crusts, ii) the equation of state is causal, iii) GR is the correct theory of gravity, and iv) their largest observed mass is 2 solar masses, when coupled with recent results from nuclear experiment and theoretical studies of neutron matter, generate powerful constraints on their structure. These include restriction of the radii of typical neutron stars to the range 11-13 km, as well as significant correlations among their masses, compactnesses, moments of inertia, binding energies, and tidal deformabilities. In addition, properties of quark matter, including the location and magnitude of the quark-hadron phase transition, can also be limited. The implications of recent and forthcoming experiments, such as those pertaining to the neutron skin thickness and astrophysical measurements of various structural properties is discussed. For the latter, emphasis is placed on pulsar timing, X-ray observations, supernova neutrino detections, and gravitational waves from mergers involving neutron stars.

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