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How well does neutron star mergers constrain the equation of state of dense matter?

The detection of gravitational waves from the neutron-star merger GW170817 provided the first firm observational constraint on the radius of neutron stars—nature’s densest visible objects. We find that modern nuclear-physics-based calculations of the equation of state of dense neutron-rich matter predict radii that are compatible but more restrictive. We critically examine associated uncertainties and determine how improved constraints from future observations can provide new insights into dense matter and possible phase transitions in the neutron-star core.

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