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The Masses and Radii of Neutron Stars Observed by NICER

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The dense interiors of neutron stars provide a window to the nature of cold matter at densities above nuclear that complements precision laboratory nuclear experiments. The uncertain physics at high density leads to a range of possible equations of state (EOS). Since each potential EOS allows a different neutron star mass and radius curve, observations of many neutron star masses and radii provide an important input that can constrain the supranuclear EOS. Pulse-profile modeling is a technique that uses the gravitationally-lensed X-ray flux emitted from hot spots on the neutron star's surface to infer its mass and radius. Since the pulsars have a strong gravitational field and rotate rapidly, general relativity is a crucial ingredient in this analysis. In this talk, I will give an overview of how the NICER Lightcurve Working Group infers the radius and mass of a neutron star, along with the latest results and the planned future observations of other pulsars.

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