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NICER Constraints on the Neutron Star Equation of State[1]

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NICER is an X-ray telescope installed on the International Space Station. The primary science targets of NICER are rotation-powered millisecond pulsars. Megasecond exposures, together with state-of-the-art effective area, event time tagging, and energy resolution, yield data of unprecedented detail. Pulse-profile modeling of NICER event data yields statistical joint measurements of the mass and radius of a pulsar with typical precision of at least $\pm 10\%$. Independent mass measurements derived by radio timing, which break a mass-radius degeneracy, boost the NICER radius measurement precision. The NICER collaboration is modeling multiple pulsars in this way, including the most massive known pulsar PSR J0740+6620. With a population of joint mass-radius measurements available, statistical measurements of the neutron star dense matter equation of state are viable. This talk will be a report of the latest measurements derived using the open source software package X-PSI (X-ray Pulse Simulation and Inference; github.com/ThomasEdwardRiley/xpsi) and nested sampling.

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