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Nuclear Physics of neutron stars[1]

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One of the overarching questions posed by the recent community report entitled "Nuclear Physics: Exploring the Heart of Matter" asks *How Does Subatomic Matter Organize Itself and What Phenomena Emerge?* With their enormous dynamic range in both density and neutron-proton asymmetry, neutron stars provide ideal laboratories to answer this critical challenge. Indeed, a neutron star is a gold mine for the study of physical phenomena that cut across a variety of disciplines, from particle physics to general relativity. In this presentation—*targeted at non-experts*—I will focus on the essential role that nuclear physics plays in constraining the dynamics, structure, and composition of neutron stars. In particular, I will discuss some of the many exotic states of matter that are speculated to exist in a neutron star and the impact of nuclear-physics experiments on elucidating their fascinating nature.

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