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Probing Physics with Observations of Neutron Stars and White Dwarfs

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White dwarfs and neutron stars are two of the densest objects in the Universe. Discovered 105 and 45 years ago, these objects are two of the best astrophysical laboratories of fundamental physics. The simple existence of white dwarfs is a stellar-size manifestation of quantum physics. I will describe how we use these objects today to study quantum-chromodynamics, quantum-electrodynamics, neutrino and axion physics and even thermodynamics in realms inaccessible to Earth-bound laboratories. In the process we also discover the detailed fate of our own Earth and Sun.