Abstract Submitted
for the TSS18 Meeting of
The American Physical Society

The Cooling of the Crab Pulsar BRIANNA DOUGLAS, LAUREN BALLIET, WILLIAM NEWTON, Texas AM University Commerce — Neutron stars are one of the most exotic objects in the universe. They are complex due to their extremely high densities. Trying to find the equation of state (EOS) exceeding nuclear saturation density is one of the many quests of nuclear physics and astrophysics. One way to constrain the EOS is to learn more about the cooling processes of neutron stars over time. Stars cool from one of two ways: emission of thermal radiation from the surface or through the emission of neutrinos from the interior of the star. Theres some circumstantial evidence that the Crab pulsar was formed in an electron-capture supernova, which is one way stars about 8-10 solar masses die. In this type of supernova, the stars core collapses at the ONeMg stage, and produces a relatively low mass neutron star of around 1.25 $M_{\odot}$. It is not certain the Crab formed this way, but in this talk we explore the possibility of ruling out the electron capture supernova scenario, and of placing constraints on the neutron star EOS, by calculating the cooling of low mass neutron stars and comparing with the measured upper limit on the Crabs temperature.

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Date submitted: 01 Mar 2018 Electronic form version 1.4