

Abstract Submitted
for the APR18 Meeting of
The American Physical Society

Delta isobars in neutron star matter¹ WILLIAM SPINELLA, Wentworth Institute of Technology, FRIDOLIN WEBER, San Diego State University — The possible formation of hyperons and delta isobars (Δ s) in neutron stars remains an open question and active area of research. While the meson-hyperon coupling constants can be somewhat constrained by experiment and theory, few results exist that can be used to unambiguously constrain the meson- Δ coupling constants. In this work we investigate the parameter space of the scalar- and vector-meson- Δ coupling constants using relativistic mean-field (RMF) models. We calculate the neutron star mass, canonical radius, critical density, and Δ fraction for the coupling space with and without the inclusion of hyperons using RMF parameterizations that take into account recent constraints from nuclear physics and neutron star observations. Our results suggest that the two-solar-mass constraint set by PSR J0348+0432 does not exclude the formation of Δ s in neutron star matter, and that the presence of Δ s may lead to a reduction of the calculated canonical neutron star radius.

¹This work is supported through the National Science Foundation grant PHY-1411708.

William Spinella
Wentworth Institute of Technology

Date submitted: 15 Feb 2018

Electronic form version 1.4