Abstract Submitted
for the APR18 Meeting of
The American Physical Society

Slowly-Rotating Neutron Stars in Massive Bigravity[1] ANDREW SULLIVAN, NICOLAS YUNES, Montana State Univ — We study slowly-rotating neutron stars in ghost-free massive bigravity. This theory modifies general relativity by introducing a second, auxiliary but dynamical tensor field that non-linearly couples to matter through the physical metric tensor. We expand the field equations to linear order in slow rotation and numerically construct solutions in the interior and exterior of the star with a set of realistic equations of state. We calculate the physical mass function and find that this function asymptotes to a constant a distance away from the surface, whose magnitude is controlled by the ratio of gravitational constants. The Vainshtein-like radius at which the physical and auxiliary mass functions asymptote to is controlled by the graviton mass scaling parameter, and outside this radius, bigravity modifications are suppressed. We also calculate the frame-dragging metric function and find that bigravity modifications are typically small in the entire range of coupling parameters explored. We finally calculate both the mass-radius and the moment of inertia-mass relations for a wide range of coupling parameters and find that both the graviton mass scaling parameter and the ratio of the gravitational constants introduce large modifications to both.

[1]Supported by NSF Grant PHY-1250636 and NASA grant NNX16AB98G.

Andrew Sullivan
Montana State Univ

Date submitted: 10 Jan 2018 Electronic form version 1.4