

Abstract Submitted
for the SES16 Meeting of
The American Physical Society

Probing Neutron Star Physics with NANOGrav and Other Millisecond Pulsars¹ H. THANKFUL CROMARTIE, University of Virginia, NANOGrav COLLABORATION — The North American Nanohertz Observatory for Gravitational Waves (NANOGrav) times ~ 50 millisecond pulsars (MSPs) scattered across the sky in order to detect an isotropic, stochastic background of gravitational waves at very low frequencies. Of the MSPs in this pulsar timing array, 24 have binary companions, and 14 were found to display significant Shapiro delay. Measurements of this general relativistic effect (in addition to standard parameters gleaned from pulsar timing) yield the systems' inclination angles and masses of both the companion star and the pulsar. While companion masses and inclination angles can be important clues in understanding binary evolution, pulsar mass measurements are absolutely critical for understanding the neutron star equation of state and mass-radius relationship. Recent Shapiro delay measurements have strongly constrained physics at hyper-nuclear densities, and planned observations of more intriguing systems could help further illuminate the mysterious nature of pulsar interiors.

¹Supported by the NSF's Physics Frontiers Center program

H. Thankful Cromartie
University of Virginia

Date submitted: 05 Oct 2016

Electronic form version 1.4