Abstract Submitted
for the APR18 Meeting of
The American Physical Society

**Prospects of gravitational nonlinear memory detection**[1] AARON JOHNSON, University of Arkansas, SHASVATH KAPADIA, University of Wisconsin-Milwaukee, ALEX HIXON, DANIEL KENNEFICK, University of Arkansas — In the first and strongest detection of gravitational waves, GW150914, approximately $3M_\odot$ were radiated away as gravitational waves from the binary black hole system as it merged. In addition to the primary AC gravitational wave, there is a secondary DC wave known as the Christodoulou or nonlinear memory. As a strong-field effect the nonlinear memory may be used for theory testing. Further, the cutoff time of the effect is related to the radius of a neutron star and therefore could be used to constrain the neutron star equation of state. The magnitude and profile of the memory can be found by using an approximation scheme, and through matched filtering, a signal to noise ratio of an event like GW150914. By varying the mass and distance parameters of the event, we find distances and source masses for which the memory of GW150914 would be detectable in advanced LIGO and future detectors.

[1]AJ received funding from a Sturgis Fellowship during this research

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Date submitted: 12 Jan 2018 Electronic form version 1.4