Abstract Submitted
for the APR18 Meeting of
The American Physical Society

Hair Loss in Parity Violating Gravity PRATIK WAGLE, NICOLAS YUNES, Montana State University, LYDIA BIERI, University of Michigan, DAVID GARFINKLE, Oakland University — The recent detection of gravitational waves by the LIGO/Virgo collaboration has allowed for the first tests of Einstein's theory in the *extreme gravity* regime, where the gravitational interaction is simultaneously strong, non-linear and dynamical. One such test concerns the rate at which binaries inspiral, or equivalently the rate at which the gravitational wave frequency increases, which can constrain the existence of hairy black holes. This is because black holes with scalar hair typically excite dipole radiation, which in turn leads to a faster decay rate and frequency chirping. In this talk, I will present a mathematical proof that scalar hair is *not* sourced in vacuum, spherically symmetric spacetimes when considering extensions of Einstein's theory that break parity in gravity, focusing on dynamical Chern-Simons theory as a particular toy model. This result implies that the observational confirmation of the baldness of black holes cannot be used to constrain parity violation in gravity, unless the black holes observed are also spinning.

Pratik Wagle
Montana State Univ

Date submitted: 02 Jan 2018 Electronic form version 1.4