Abstract Submitted
for the APR18 Meeting of
The American Physical Society

Linearized Stability of Extreme Black Holes LIOR M. BURKO, Georgia Gwinnett College, GAURAV KHANNA, University of Massachusetts Dartmouth — Extreme black holes have been argued to be unstable, in the sense that under linearized gravitational perturbations of the extreme Kerr spacetime the Weyl scalar ψ_4 blows up along their event horizons at very late advanced times. We show numerically, by solving the Teukolsky equation in 2+1D, that all algebraically-independent curvature scalar polynomials approach limits that exist when advanced time along the event horizon approaches infinity. Therefore, the horizons of extreme black holes are stable against linearized gravitational perturbations. We argue that the divergence of ψ_4 is a consequence of the choice of a fixed tetrad, and that in a suitable dynamical tetrad all Weyl scalars, including ψ_4, approach their background extreme Kerr values. We make similar conclusions also for the case of scalar field perturbations of extreme Kerr.

Lior Burko
Georgia Gwinnett College

Date submitted: 08 Dec 2017 Electronic form version 1.4