Abstract Submitted
for the APR13 Meeting of
The American Physical Society

**Intermediate behavior of Kerr Black Hole tails** ANIL ZENGINOĞLU, California Institute of Technology, GAURAV KHANNA, University of Massachusetts Dartmouth, LIOR M. BURKO, Alabama A&M University — The numerical investigation of wave propagation in the asymptotic domain of Kerr spacetime has only recently been possible thanks to the construction of suitable hyperboloidal coordinates. The asymptotics revealed a puzzle in the decay rates of scalar fields: the late-time rates seemed to depend on whether finite distance observers are in the strong field domain or far away from the rotating black hole, an apparent phenomenon dubbed 'splitting'. We discuss far-field splitting in the full field and near-horizon splitting in certain projected modes using horizon-penetrating, hyperboloidal coordinates. For either case we propose an explanation to the cause of the splitting behavior. The far-field splitting is explained by competition between projected modes. The near-horizon splitting is due to excitation of lower multipole modes that back excite the multipole mode for which splitting is observed. In both cases splitting is an intermediate effect, such that asymptotically in time strong field rates are valid at all finite distances. At any finite time, however, there are three domains with different decay rates whose boundaries move outwards during evolution.

Lior M. Burko
Alabama A&M University

Date submitted: 09 Jan 2013 Electronic form version 1.4