Abstract Submitted
for the APR18 Meeting of
The American Physical Society

The superradiant instability of massive vector fields around spinning black holes WILLIAM EAST, Perimeter Inst for Theo Phys, FRANS PRETORIUS, Princeton University — In the presence of a massive bosonic field, spinning black holes are in fact unstable to superradiance. This leads to the exciting possibility that observations of astrophysical black holes can be used to probe the existence of axions, dark photons, or other ultralight bosons with Compton wavelength comparable to the black hole's radius. Focusing on the specific case of a massive vector field, I will present results on the linear growth and subsequent nonlinear behavior of the superradiant instability. In particular, we find that the instability smoothly saturates when the black hole has lost sufficient rotational energy for it's horizon frequency to the match the frequency of the bosonic cloud that spontaneously forms around it. I will also describe the gravitational wave signal produced by such an oscillating cloud, which could be a potential target for LIGO.

William East
Perimeter Inst for Theo Phys

Date submitted: 12 Jan 2018 Electronic form version 1.4