Second order perturbation of a Kerr black holes JUSTIN RIPLEY,
ELENA GIORGI, NICHOLAS LOUTREL, FRANS PRETORIUS, Princeton University — We present on progress to compute the second order metric perturbation
of a Kerr black hole. Out motivation for pursuing this project includes (1) to understand the regime of applicability of the Teukolsky equation in describing the
ringdown of Kerr black hole formed after the merger of two similar mass compact
objects, and (2) to understand the proposed onset of "gravitational wave turbulence"
around very rapidly spinning Kerr black holes. Our procedure for numerically computing the second order perturbation incorporates several observations made by
researchers in the mathematical relativity community in their work towards a proof
of the nonlinear stability of Kerr black holes.

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