

Abstract Submitted
for the APR17 Meeting of
The American Physical Society

Black hole mergers: beyond general relativity LEO STEIN, MARIA OKOUNKOVA, Caltech — One hundred years after the birth of general relativity, advanced LIGO has finally directly detected gravitational waves. The source: two black holes merging into one. Advanced LIGO will soon provide the opportunity to test GR, using gravitational waves, in the dynamical strong-field regime—a setting where GR has not yet been tested. GR has passed all weak-field tests with flying colors. Yet it should eventually break down, so we must look to the strong-field. To perform strong-field tests of GR, we need waveform models from theories *beyond* GR. To date there are no numerical simulations of black hole mergers in theories which differ from GR. The main obstacle is the mathematical one of well-posedness. I will explain how to overcome this obstacle, and demonstrate the success of this approach by presenting the first numerical simulations of black hole mergers in a theory beyond GR.

Leo Stein
Caltech

Date submitted: 27 Sep 2016

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