Abstract Submitted
for the APR20 Meeting of
The American Physical Society

Computing the Electric Part of the Weyl Curvature Tensor with SpECTRE SIERRA THOMAS, GEOFFREY LOVELACE, California State University, Fullerton, LIGO COLLABORATION, SIMULATING EXTREME SPACETIMES COLLABORATION — Extracting as much science as possible from the high signal-to-noise gravitational waves that next-generation detectors will observe requires model gravitational waveforms with substantially higher accuracy. In pursuit of this goal, the SXS Collaboration is developing a next-generation numerical-relativity code called SpECTRE. By using the Discontinuous Galerkin method to numerically solve differential equations and task-based parallelism, SpECTRE will be able to efficiently take advantage of future exascale computing (i.e., its performance will scale to tens of thousands of computer processors) to achieve much greater speed and accuracy. In this talk, I will discuss calculating the electric part of the Weyl curvature tensor using SpECTRE. The electric part of the Weyl tensor characterizes tidal deformations of an observer caused by spacetime curvature and is one ingredient for computing the emitted gravitational waves. I will present results computing the Weyl tensor for a SpECTRE simulation of a perturbed black hole, including a discussion of accuracy and performance.

Sierra Thomas
California State University, Fullerton

Date submitted: 10 Jan 2020 Electronic form version 1.4