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Exploring the Use of Discontinuous Galerkin Methods for Numerical Relativity FRANCOIS HEBERT, LAWRENCE KIDDER, SAUL TEUKOLSKY, Cornell University, SXS COLLABORATION — With Advanced LIGO expected to start detecting gravitational wave signals in the next several years, it is important that numerical simulations be able to generate the accurate gravitational wave templates used for both detection and parameter estimation. Generating these accurate gravitational wave templates is particularly challenging for black hole-neutron star mergers or binary-neutron star mergers: the algorithms used in the matter evolution, based on the finite volume method, struggle to reach the desired accuracy. We believe that a different type of algorithm, the discontinuous Galerkin method, would significantly increase the simulation accuracy thanks to its spectral convergence properties for smooth solutions and its robust stability properties for shocks. We present here our initial work implementing and testing a discontinuous Galerkin code on simple problems, leading towards the development of a discontinuous Galerkin-based GR hydro code.

Francois Hebert
Cornell University

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