Abstract Submitted
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Towards Accurate Modeling of Binary Black Holes[1] DAE-IL CHOI, USRA & NASA/GSFC, JOAN CENTRELLA, JOHN BAKER, NASA/GSFC, JIM VAN METER, DAVID FISKE, MICHAEL KOPPITZ, NRC & NASA/GSFC, BRENO IMBIRIBA, DARIAN BOGGS, UMD & NASA/GSFC, DAVID BROWN, NCSU, LISA LOWE, NCSU — Massive black holes (MBHs) that are believed to reside at the centers of all galaxies with bulges will form a binary and coalesce into each other following a galactic merger. The final stage of MBH binary evolution is a strong source of low frequency gravitational waves for the joint NASA/ESA LISA mission. The merging phase of the coalescence will provide an excellent opportunity to investigate Einstein's theory of general relativity in a strong nonlinear regime. Encouraging progress has been made recently in numerical relativity simulations of orbiting/merging black holes; however a long term and accurate evolution of a realistic situation has yet to be demonstrated. Using mesh refinement techniques, we focus on accurate simulations of the source (merging binary black holes) and accurate extraction of the generated gravitational waves. We study a head-on collision as the first model problem for a thorough validation of our approach. I will discuss some of the issues involved and present recent results.

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