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Evolving the Wave Equation on Hyperboloidal Slices[1] SAMUEL CUPP, Austin Peay State University, PETER DIENER, FRANK LÖFFLER, Louisiana State University — The Extreme Mass Ratio Inspiral problem (EMRI), a system of interest for numerical relativity and important model for gravitational wave research, consists of a compact object spiraling into a supermassive black hole. In such systems the inspiral evolution is partly determined by waves propagating out from the compact object, back scattering off the space-time curvature and returning to interact with the compact object at a later time. Thus, in principle, it is necessary to have the computational domain extend all the way to infinity. Here we use compactification and hyperboloidal slicing to achieve this for the scalar wave equation (used as a simpler test problem than the full gravitational case). Our derivation and implementation for a flat space-time successfully propagates waves to infinity and resolves both a pulse and a continuous boundary wave for this space-time.

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