1023-83-1265 **Luisa T. Buchman*** (lbuchman@physics.utexas.edu), University of Texas at Austin, Center for Relativity, 1 University Station C1600, Austin, TX 78712, and **Olivier C. A. Sarbach**.
Towards absorbing outer boundaries in General Relativity.

We construct exact solutions to the Bianchi equations on a flat spacetime background. When the constraints are satisfied, these solutions represent in- and outgoing linearized gravitational radiation. We then consider the Bianchi equations on a subset of flat spacetime of the form $[0,T] \times B_R$, where B_R is a ball of radius R, and analyze different kinds of boundary conditions on ∂B_R. With the help of the exact solutions constructed, we determine the amount of artificial reflection of gravitational radiation from constraint-preserving boundary conditions which freeze the Weyl scalar Ψ_0 to its initial value. For monochromatic radiation with wave number k and arbitrary angular momentum number $\ell \geq 2$, the amount of reflection decays as $(kR)^{-4}$ for large kR. For each $L \geq 2$, we construct new local constraint-preserving boundary conditions which perfectly absorb linearized radiation with $\ell \leq L$. We generalize our analysis to a weakly curved background of mass M, and compute first order corrections in M/R to the reflection coefficients for quadrupolar radiation. (Received September 25, 2006)