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Helge Kristian Jensen and **Charis Tsikkou*** (tsikkou@math.wvu.edu). *Radial Solutions to the Cauchy Problem for $\square_{1+3}U = 0$ as Limits of Exterior Solutions.*

We consider the strategy of realizing the solution of a Cauchy problem with radial data as a limit of radial solutions to initial-boundary value problems posed on the exterior of vanishing balls centered at the origin. The goal is to gauge the effectiveness of this approach in a simple, concrete setting: the 3-dimensional, linear wave equation $\square_{1+3}U = 0$ with radial Cauchy data $U(0, x) = \Phi(x) = \phi(|x|)$, $U_t(0, x) = \Psi(x) = \psi(|x|)$.

We are primarily interested in this as a model situation for other, possibly nonlinear, equations where neither formulae nor abstract existence results are available for the radial symmetric Cauchy problem. In treating the 3-d wave equation we therefore insist on robust arguments based on energy methods and strong convergence. Our findings show that while one can obtain existence of radial Cauchy solutions via exterior solutions, one should not expect such results to be optimal. We also show that external Neumann solutions yield better regularity than external Dirichlet solutions. (Received January 18, 2016)