1023-22-1259 **Markus Hunziker*** (Markus_Hunziker@baylor.edu), Department of Mathematics, Baylor University, One Bear Place #97328, Waco, TX 76798, and **Mark R. Sepanski** (Mark_Sepanski@baylor.edu) and **Ronald J. Stanke** (Ronald_Stanke@baylor.edu). *Conformal symmetries of the wave equation and the ladder representation of* $SO(2, n+1)$. Preliminary report.

Lie's prolongation method calculates the infinitesimal symmetries of the wave equation on $\mathbf{R}^{n+1}$ to be $\mathfrak{g} = \mathfrak{so}(2, n+1)$ plus an infinite dimensional piece and one obtains an action of $\mathfrak{g}$ on the smooth solutions of the wave equation. However, this action does not exponentiate to an action of the group $G = SO(2, n+1)$. To obtain an action of the group G (or a two-fold cover of G if n is even), we restrict the action to a natural subspace of functions that is defined by restricting sections of a certain line bundle on a compact homogenous space G/P to an open and dense copy of $\mathbf{R}^{n+1}$. The wave operator then arises from a combination of the Casimir elements of a distinguished copy of $\mathfrak{sl}(2, \mathbf{R})$ and $\mathfrak{so}(n)$. We use this fact to study the resulting representations and to give explicit formulas for solutions of the wave equation. (Received September 25, 2006)