1099-35-163 **John A Helms*** (johnhelms@math.ucsb.edu), Department of Mathematics, University of California, Santa Barbara, CA 93106-3080, and **Jason L Metcalfe** (metcalfe@email.unc.edu), Department of Mathematics, University of North Carolina, Chapel Hill, NC 27599-3250. *Almost Global Existence for 4-Dimensional Quasilinear Wave Equations in Exterior Domains.*

This is joint work with Professor Jason Metcalfe (UNC Chapel Hill). This talk will be about quasilinear wave equations in 4 spatial dimensions in the exterior of a smooth, bounded domain. The nonlinearity is allowed to depend the solution itself at the quadratic level as well as the first and second derivatives of the solution. This work follows the original proof by Hörmander in which he proved the lifespan bound of $T_\epsilon \gtrsim \exp(c/\epsilon)$ in Minkowski space $\mathbb{R}^{1+4}$. Du, Sogge, Zhou and Metcalfe have showed that this inequality also holds in the exterior of star-shaped domains. In our work, we only require that the geometry of the exterior domain allow for a sufficiently rapid decay of local energy for solutions to linear homogeneous wave equations. This demonstrates that the lifespan bound of Hörmander holds in certain exterior domains in which there are trapped rays. We use the boundary term estimates of Metcalfe and Sogge in conjunction with a variant of the estimate of Klainerman and Sideris. This estimate will be obtained via the Sobolev inequality of Du and Zhou. (Received February 06, 2014)