1056-35-1449   **Jonathan Luk***, Department of Mathematics, Fine Hall, Washington Road, Princeton, NJ 08540.
Decay Rate for the Linear Wave Equation on a Schwarzschild Black Hole.

We prove that sufficiently regular solutions to the wave equation $\Box_g \phi = 0$ on the exterior of the Schwarzschild black hole obey the estimates $|\phi| \leq C_\delta v_+^{-\frac{3}{2}+\delta}$ and $|\partial_t \phi| \leq C_\delta v_+^{-2+\delta}$ on a compact region of r and along the event horizon. This is proved with the help of a new vector field commutator that is analogous to the scaling vector field on Minkowski spacetime. This result improves the known decay rates in the region of finite r and along the event horizon. (Received September 21, 2009)

1