

Meeting: 1007, Santa Barbara, California, SS 8A, Special Session on Geometry and Physics

1007-83-97 **Pengzi Miao*** (pengzim@math.ucsb.edu), Department of Mathematics, University of California, Santa Barbara, Goleta, CA 93106. *On Boundary Effects in Static Vacuum Initial Data Sets.*

Let (M^3, g) be a time-symmetric asymptotically flat static vacuum initial data set with non-empty boundary Σ^2 in general relativity. It is generally believed that Σ^2 gives key contribution to the total ADM energy of (M^3, g) . Following this belief, we derive boundary conditions on Σ^2 that imply no existence of apparent horizons of black holes enclosing Σ^2 in M^3 . Assuming Σ^2 is totally umbilical and isometric to a round sphere, we establish the equality between the total ADM energy of (M^3, g) and the Hawking quasi-local mass of Σ^2 , hence prove that (M^3, g) is isometric to part of a Schwarzschild manifold. (Received February 08, 2005)