Title: *A Proposal to Numerically Simulate a Cosmic Shock Wave by Use of a Locally Inertial Glimm Scheme*

Author: Blake Temple, AMS Annual Meeting, Special Session Numerical Relativity, New Orleans, January 2007

Abstract: In this talk I discuss a proposal to numerically simulate a cosmological shock wave using ideas that arose in the author's earlier work on the locally inertial Glimm Scheme. The problem is motivated by prior joint work with J. Smoller, (Proc. Nat. Acad. Sci., USA, Vol. 100, no. 20, pp. 11216-11218), in which we introduced a new exact solution of the Einstein equations in which the explosion of the Big Bang generates an outgoing, spherical, entropy satisfying shock wave. In this model, the Big Bang begins inside a (time reversed) Black Hole–a White Hole in which everything is running backwards, exploding outward instead of collapsing inward. Our recent work indicates that a wave qualitatively similar to this exact solution would emerge from the standard inflationary cosmology if the spacelike slice that emerged co-moving with the perfect fluid at the end of inflation, were a space of "finite total mass". In this talk I discuss a proposal to numerically simulate this exactly using numerical ideas arising from the author's analysis of a locally inertial Glimm Scheme for spherically symmetric spacetimes. We wonder whether the secondary waves might account for the anomalous acceleration of the galaxies that is currently accounted for by the mysterious "Dark Energy". The author's work in cosmology is all joint work with Joel Smoller, while the idea of the locally inertial Glimm Scheme was introduced in the author's joint work with Jeffrey Groah. Involved in the numerical project will be UC-Davis students Brian Wissman and Zeke Vogler. (Articles and commentaries can be found on author's website: http://www.math.ucdavis.edu/ temple/articles/)