Abstract Submitted
for the APR06 Meeting of
The American Physical Society

Well-posed 3+1 representation of the Bondi-Sachs problem SIMONETTA FRITTELLI, Duquesne University — Conventionally, in the case of the Einstein equations, characteristic problems have been stated in the Bondi-Sachs form, whereas Cauchy-problems have been formulated in the ADM form, and both problems have been pursued independently of each other. Yet characteristic and Cauchy problems are only two sides of the same differential equations. Under the restriction of spherical symmetry, we provide a 3+1 version of the Einstein equations that functions as the initial-value representation of the Bondi-Sachs equations. This is a well-posed ADM formulation that allows us to interpret the Bondi-Sachs variables precisely in terms of outgoing characteristic fields. The ADM form is automatically first-order in time, with no need for reduction. Both these features have relevance to numerical simulations. We indicate which of the features are maintained when the assumption of symmetry is removed.

Simonetta Frittelli
Duquesne University

Date submitted: 17 Jan 2006 Electronic form version 1.4