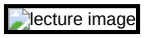

Special Guest Lectures

Numerical Relativity beyond Scri+

Charles Misner
University of Maryland
Johnston Hall 338
May 08, 2006 - 03:30 pm

Abstract:
With van Meter and Fiske I have studied the numerical propagation of waves through future null infinity in a conformally compactified spacetime. We introduced an artificial cosmological constant, which allows us some control over the causal structure near null infinity. We exploited this freedom to ensure that all light cones are tilted outward in a region near null infinity, which allows us to impose excision-style boundary conditions in our finite difference code. [This step would be much simplified if one used a spherical computational boundary.] In this preliminary study we considered electromagnetic waves propagating in a static, conformally compactified spacetime. Generalization to a Yang-Millsexample should be straight-forward, but non-linearities could be met at Scri+ since, in compactified form, wave amplitudes remain large there. For extention to general relativity one would need to see whether the (singular) compactifying factor could (as with punctures) be insulated from the numerical implementation.

Speaker's Bio:
Charles W. Misner is a well known scientist who has specialized in Einstein's theory of gravity. His research has included black holes, the big-bang Universe, gravitational waves, as well as mathematical and computational aspects of Einstein's theory. He is the author (with John A Wheeler and Kip S Thorne) of a widely used graduate text Gravitation, and has spent extended periods at Caltech, Cambridge and Oxford (U.K.), UC Santa Barbara, and Potsdam, Germany. He taught for nearly forty years at the University of Maryland, and has received a major prize from the American Physical Society for his research with Arnowitt and Deser.

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