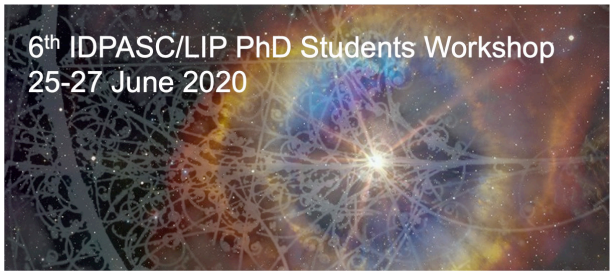

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Hyperbolicity of General Relativity in Bondi-like gauges

Friday, 26 June 2020 14:40 (12 minutes)

Bondi-like (single-null) characteristic formulations of general relativity are used for numerical work in both asymptotically flat and anti-de Sitter spacetimes. Well-posedness of the resulting systems of partial differential equations, however, remains an open question. The answer to this question affects the accuracy and reliability of conclusions drawn from numerical studies based on such formulations. A numerical approximation can converge to the continuum limit only for well-posed systems; for the initial value problem this is characterized by strong hyperbolicity. We find that, due to a shared pathological structure, the systems arising from the aforementioned formulations are however only weakly hyperbolic. We present numerical tests for toy models that demonstrate the consequence of this shortcoming in practice for the characteristic initial boundary value problem.

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