

## Contributed Talk

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**Title:** Hyperbolicity of General Relativity in null foliations

**Abstract:** Characteristic formulations of General Relativity are based on a null foliation of the spacetime. When combined with the standard Cauchy evolution they can in principle provide highly accurate waveform modelling. During this modelling process it is typical that the full non-linear Einstein field equations are solved numerically. A numerical solution to a PDE problem can converge to the continuum one with increasing resolution only for well posed PDE problems. Well posedness of the initial value problem in the L2 norm is characterized by strong hyperbolicity of the PDE system. It was recently found that the PDE systems formed by Einstein's field equations in commonly used characteristic gauges are only weakly hyperbolic. I will review the basic features of the commonly used characteristic gauges of the Bondi family and argue that within this family a strongly hyperbolic PDE system from Einstein's field equations is not possible, if at most first derivatives of the metric are introduced as variables. I will further provide an example of how weak hyperbolicity may be demonstrated in numerical simulations.