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Maurer-Cartan perturbation theory and scattering amplitudes in general relativity

Thursday 6 June 2024 16:30 (1 hour)

I will describe a differential graded Lie algebra tailored to study perturbations of Minkowski spacetime, including asymptotics. This differential graded Lie algebra is defined on the conformal compactification of Minkowski spacetime. Its Maurer-Cartan equation is equivalent to the vacuum Einstein equations, and is symmetric hyperbolic including across the boundary of Minkowski spacetime. I will compare this to Friedrich's conformal vacuum field equations. Given this differential graded Lie algebra, one can use basic Maurer-Cartan perturbation theory to construct formal power series solutions about Minkowski, which extend smoothly to null infinity. I will explain that, in low order formal perturbation theory, the radiative null asymptotics of these solutions is described by the gauge independent physical scattering amplitudes.

Presenter: NÜTZI, Andrea