

Progress on the definition of asymptotically flat and de Sitter spacetimes

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The definition of scattering in asymptotically flat spacetimes requires to consistently match its five asymptotic boundaries: past/future timelike infinity, past/future null infinity and spatial infinity. I will present a framework consistent with logarithmic corrections to soft theorems where a single BMS group acts on all boundaries and where individual ingoing/outgoing bodies are ascribed initial/final BMS charges. Using the post-Minkowskian expansion, I will demonstrate that non-radiative regions are entirely characterized by a set of conserved celestial charges that consist of the Geroch-Hansen multipole moments, the generalized BMS charges and additional non-stationary multipole moments. In the context of asymptotically de Sitter spacetimes, I will finally demonstrate that the presence of a quadrupole moment of any localized source in de Sitter leads to a fluctuating boundary metric that breaks the conformal asymptotic symmetry group. Dynamical Einstein gravity in de Sitter cannot therefore be modelled by a 3d CFT. Based on work performed with S. Gralla, H. Wei, R. Oliveri, A. Seraj, L. Blanchet, G. Faye, J. Hoque and E. Kutluk.

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