

Gravitational S-matrix, infrared divergences and BMS representations

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In the last years, it has been demonstrated that asymptotic symmetries of gravity (the so called BMS group) constrain the gravitational S-matrix. In particular, infrared divergences of the gravitational S-matrix are now understood to arise from the impossibility of the usual fock space of massless particles to ensure the conservation of the BMS charges.

I will review these results taking the original perspective of representation theory: It is indeed natural to conjecture that asymptotic states suited for an infrared finite S-matrix should be unitary representations of the BMS group and thus BMS particles, rather than the usual Poincaré particles of Wigner.

In a recent work with X. Bekaert and L. Donnay we constructed explicitly such BMS particles and this talk aim to serve as an introduction for Xavier's.

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