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Scattering Amplitudes: Celestial and Carrollian

Recent attempts at the construction of holography for asymptotically flat spacetimes have taken two different routes. Celestial holography, involving a two dimensional (2d) CFT dual to 4d Minkowski spacetime, has generated novel results in asymptotic symmetry and scattering amplitudes. A different formulation, using Carrollian CFTs, has been principally used to provide some evidence for flat holography in lower dimensions. Understanding of flatspace scattering has been lacking in the Carroll framework. In this work, using ideas from Celestial holography, we show that 3d Carrollian CFTs living on the null boundary of 4d flatspace can potentially compute bulk scattering amplitudes. 3d Carrollian conformal correlators have two different branches, one depending on the null time direction and one independent of it. We propose that it is the time-dependent branch that is related to bulk scattering. We construct an explicit field theoretic example of a free massless Carrollian scalar that realises some desired properties.

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