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Spinning correlators in Celestial Holography

The study of holographic dualities going beyond the traditional AdS/CFT correspondence has seen a strong impulse in recent years, especially in the context of Minkowski space for the so called Celestial Holography program.
Differently from the case of AdS space, whose boundary lies at spatial infinity and possesses a well defined notion of locality and unitary time evolution, the boundary of Minkowski space (the so-called celestial sphere) lies at null infinity, making obscure how the boundary correlators can encode these basic notions.
The recent progress in the study of Celestial Holography has been driven by the discovered connections with flat space S-matrices: a first approach to celestial correlation functions has been to define them as integral transform of flat space scattering amplitudes. This approach led to successful results for massless particles owing to the fact that the corresponding geodesics reach null infinity. On the other hand, for the case of massive particles, where the geodesics do not reach null infinity, the connection with the S-matrix is less transparent. This observation led to the introduction of another promising approach to celestial correlators, based on a hyperbolic foliation of Minkowski spacetime: the correlators on the celestial sphere are defined extrapolating the time-ordered correlators in Minkowski space via a radial Mellin transform and a boundary limit in the hyperbolic directions. In this way holography on the celestial sphere is defined by applying holography to each hyperbolic slice and time-ordering of the bulk points in flat space is manifestly respected by the corresponding celestial correlation functions. Following this new prescription to define the celestial correlators, we are interested in investigating the boundary counterpart of correlation functions of spinning fields in the Minkowski bulk space, focusing on the key aspects that can present insights for the holographic principle beyond the AdS case.

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