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The Boostless Bootstrap: Amplitudes without Lorentz boosts

Wednesday 16 December 2020 14:30 (30 minutes)

Poincare invariance is a well-tested symmetry of nature and sits at the core of our description of relativistic particles and gravity. However, in cosmology the ground state breaks invariance under Lorentz boosts, which motivated us to study scattering amplitudes without requiring this symmetry. In particular, using on-shell methods and assuming massless, relativistic and luminal particles of any spin, I explain how the allowed interactions around Minkowski spacetime are severely constrained by unitarity and locality in the form of consistent factorization. In particular, the existence of an interacting massless spin-2 particle enforces three-particle interactions to be Lorentz invariant, even those that do not involve a graviton, such as cubic scalar couplings. Our findings are highly sensitive to IR deformations and therefore these flat-space results do not straightforwardly apply to curved spacetime. Instead, I comment on the implications to Lorentz violating extensions of the Standard Model.

Would you be interested in receiving feedback on your talk?

Yes

Will you be pre-recording your talk?

Yes

Length of talk

15-25 minutes

Are you happy for your talk to be recorded?

Yes

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