

Phenomenology 2021 Symposium



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Positivity in Multi-Field EFTs

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This talk discuss the general method for obtaining full positivity bounds on multi-field effective field theories (EFTs), from analyticity and unitarity requirements on the UV theory. We then identify the allowed parameter space as the dual to a spectrahedron, constructed from crossing symmetries of the amplitude, and show that finding the optimal bounds for a given number of modes is equivalent to a geometric problem: finding the extremal rays of a spectrahedron, we show how this is done analytically for simple cases, and numerically formulated as semidefinite programming (SDP) problems for more complicated cases. We demonstrate this approach with a number of well-motivated examples in particle physics and cosmology, including EFTs of scalars, vectors, fermions and gravitons.

Summary

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