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Unitarisation of EFT Amplitudes for Dark Matter Searches at the LHC

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We propose a new approach to the LHC dark matter search analysis within the effective field theory (EFT) framework by utilising the K-matrix unitarisation formalism. This approach provides a reasonable estimate of the dark matter production cross section at high energies and hence allows to put reliable bounds on the cut-off scale of relevant operators without running into the problem of perturbative unitarity. We exemplify this procedure for the effective operator D5 in monojet searches of dark matter in the collinear approximation. We compare our bounds to those obtained using the truncation method and identify a region of parameters where the unitarisation prescription leads to more stringent bounds.

Summary

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