

Maximal CP violation from long-range forces

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CP violation plays a crucial role in explaining the observed matter–antimatter asymmetry of the Universe. While standard baryo-/leptogenesis scenarios typically predict small CP asymmetries arising from the interference between tree-level and loop-level diagrams, we demonstrate that scatterings of non-relativistic particles mediated by a light force carrier can generate order-1 CP asymmetries and cross-sections that saturate partial-wave unitarity bounds. Notably, the (nearly) maximal values of the cross-sections and CP asymmetries can be reached even for weak coupling strength, at sufficiently low velocities.

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