

Present and future sensitivity of WIMP direct detection in EFT

Friday, July 6, 2018 3:08 PM (17 minutes)

There are many underground experiments which are currently looking for Weakly Interacting Massive Particles (WIMPs) that are the most popular candidate of dark matter. In these direct detection experiments, the signal are recoil events of WIMP elastic scattering off target nuclei. The effective field theory (EFT) provides a general and efficient way to characterize experiment results. In particular, for non-vanishing momentum transfer, in addition to the standard spin-independent and spin-dependent interactions, new operators arise giving rise to non-standard interactions.

Guided by non-relativistic EFT, we classify the most general interactions between scalar or fermionic WIMP and nuclei. We study exclusion plots for different types of interactions which in WIMPs direct detection are the measure of the relative sensitivity of different experiments. In this work, we study exclusion plots for newly arising non-standard interactions for existing experiments including the effects of isospin violation. We also discuss the spectral shape in WIMPs effective models and present the exclusion plots for current as well as future experiments. In our analysis, the velocity distribution of dark matter is fixed to a Maxwellian.

Primary authors: Mr KANG, Seong-Hyeong (Sogang University); Mr SCOPEL, Stefano (Sogang University); TOMAR, Gaurav (Sogang University); Mr YOON, Jong-Hyun (Sogang University)

Presenter: TOMAR, Gaurav (Sogang University)

Session Classification: Dark Matter Detection

Track Classification: Dark Matter Detection