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Università di Cagliari  
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# HIGH ENERGY PHYSICS COLLOQUIA

3 maggio 2016 · ore 15:00 · aula G

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## THE NON-RELATIVISTIC EFFECTIVE FIELD THEORY OF DARK MATTER DIRECT DETECTION

### Abstract

Understanding the nature of dark matter is one of the most intriguing puzzles in physics. At present, a plausible explanation is that dark matter is constituted by Weakly Interacting Massive Particles (WIMPs). Direct detection searches for signals from dark matter scattering off nuclei in underground detectors. Assumptions on the kind of interaction together with current null results on direct detection experiments lead to constraint on the cross sections per nucleon as a function of the dark matter mass. Most models of WIMPs invoke new physics where new phenomena can appear at low scales and consequently, effective field theories (EFTs) provide a general way to characterize experiment results. Taking into account the large number of existing models and/or EFT operators for dark matter, it may appear difficult to exhaustively categorize all the possible interactions that could be tested by direct detection. In this presentation, a simple non-relativistic EFT is introduced to describe dark matter-nuclei interactions without referring to any specific model. The experimental results of the DarkSide-50 experiment at LNGS, in terms of the EFT for the interaction between argon nuclei and dark matter particle, will be also shown.

### Contatti:

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