

Influence of the axion-nucleon interaction on the direct detection of dark matter

Thursday 12 December 2024 14:50 (20 minutes)

Axions and Axion-Like-Particles (ALPs) are theoretically well-motivated candidates for dark matter that, due to their large occupation number, can be described as oscillating classical fields. At low energies, canonical QCD axions have a model-independent quadratic interaction with nucleons that can be extended to gluon-coupled ALPs. Nucleon densities modify the axion's and ALP's field dynamics, inducing a very interesting phenomenology. In this talk, I will treat in a general setting, how the Earth, as an object made out of mainly nucleons, modifies the sensitivities of direct detection experiments such as CASPER. I will show the regions of the parameter space with noticeable effects, where current and future experimental sensitivities can be modified. I will also discuss the applicability of the results when the Earth's acceleration is taken into account. For this purpose, I will discuss the time dependence of the field and its relaxation times to stationary configurations.

Author: Mr GARCIA DEL CASTILLO, Yeray

Presenter: Mr GARCIA DEL CASTILLO, Yeray

Session Classification: Light and ultralight physics