

Search for ultralight scalar dark matter with quadratic interactions

In this talk, I will discuss about my recent work on the searches for the ultralight scalar dark matter with quadratic interactions with SM fields. This will lead to the effective interactions between the ultralight dark matter and the nucleon fields $\phi^2 N N/f$ below the QCD confinement scale, which can be thought as potential barrier for the dark matter wind in the presence of ordinary matter. When the potential barrier is large enough compared with the kinetic energy of the dark matter, the dark matter flux will bounce back from the ordinary object, as a result inducing a pressure force on the object. After taking into the constraints from Supernova cooling, BBN and gravitational inverse square law test, there exists parameter spaces in our model which can be searched for by utilizing this force effect on the experiment for the test of the weak equivalence principle.

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