Contribution ID: **22** Type: **not specified**

Extending Dark Matter Search Down to Sub-GeV Mass Range

Monday 14 November 2022 14:30 (15 minutes)

Although the dark matter direct detection experiments have advanced a lot to set very stringent bound on the GeV˜TeV scale WIMP particles, the sub-GeV window is still open and waiting for further exploration. In addition to inventing new experimental probes, it is of more interest to extend the physics potential of existing direct detection experiments. I will provide two examples of achieving this, the cosmirc ray boosted DM and the fermionic absorption DM. Both cases can overcome the experimental energy threshold to open the sub-GeV window. The first relies on near-relativistic DM flux accelerated by the high-energy cosmic rays while the second releases its mass into energy to make the target particles more energetic. Without making any modification to, direct detection experiments such as PandaX and Xenon1T can significantly extend their sensitive region down to the sub-GeV range.

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Session Classification: Session II