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(Now combined) Dark matter search with a light mediator at PandaX-II experiment

One of the primary goals of many direct dark matter (DM) experiments have been focused on detecting weakly interacting massive particles (WIMPs). Usually, these searches assume a point-like contact interaction between DM and nucleons. However, it is possible that they interact with the exchange of a light mediator with masses comparable to the momentum transfer of the process involved, in which case the contact interaction assumption is no longer valid.

In this talk, we present experimental cross section limits on DM-nucleon interaction via a light mediator in PandaX-II, a direct detection experiment in China JinPing underground Laboratory. We use data collected in 2016 and 2017 runs, corresponding to a total exposure of 54 ton day, the largest published data set of its kind to date. In the context of a few benchmark self-interacting dark matter models with a light mediator mixing with nucleons, we set strongest limits on the mediator mass for DM masses ranging from $5 \text{ GeV}/c^2$ to $10 \text{ TeV}/c^2$.

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