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New Physics searches using ProtoDUNE and the CERN SPS accelerator

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The exquisite capabilities of liquid Argon Time Projection Chambers make them ideal to search for weakly interacting particles in Beyond the Standard Model scenarios. Given their location at CERN the ProtoDUNE detectors may be exposed to a flux of such particles, produced in the collisions of 400 GeV protons (extracted from the Super Proton Synchrotron accelerator) on a target. Here we point out the interesting possibilities that such a setup offers to search for both long-lived unstable particles (Heavy Neutral Leptons, axion-like particles, etc) and stable particles (e.g. light dark matter, or millicharged particles). Our results show that, under conservative assumptions regarding the expected luminosity, this setup has the potential to improve over present bounds for some of the scenarios considered. This could be done within a short timescale, using facilities that are already in place at CERN, and without interfering with the experimental program in the North Area.

Submitted on behalf of a Collaboration?

No

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