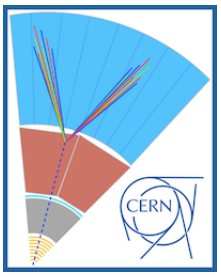

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SHADOWS (20+5)

Tuesday 9 November 2021 14:20 (25 minutes)

We propose a new beam-dump experiment, SHADOWS, to search for a large variety of feebly-interacting particles possibly produced in the interactions of a 400 GeV proton beam with a high-Z material dump. SHADOWS will use the 400 GeV primary proton beam extracted from the CERN SPS currently serving the NA62 experiment in the CERN North area and will take data off-axis when the P42 beam line is operated in beam-dump mode. SHADOWS can accumulate up to a ˜2 x10ˆ19 protons on target per year and expand the exploration for a large variety of FIPs well beyond the state-of-the-art in the mass range of MeV-GeV in a parameter space that is allowed by cosmological and astrophysical observations. So far the strongest bounds on the interaction strength of new feebly-interacting light particles with Standard Model particles exist up to the kaon mass; above this threshold the bounds weaken significantly. SHADOWS can do an important step into this still poorly explored territory and has the potential to discover them if they have a mass between the kaon and the beauty mass. If no signal is found, SHADOWS will push the limits on their couplings with SM particles between one and four orders of magnitude in the same mass range, depending on the model and scenario.

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