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Physics Performance Benchmarks For The New MoEDAL-MAPP Detector

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The Monopole and Exotics Detector at the LHC (MoEDAL) experiment is the 7th LHC experiment; a pioneering experiment specifically dedicated to investigating beyond The Standard Model (SM) scenarios by searching for highly ionizing particles, such as magnetic monopoles or massive pseudo-stable charged particles and multiply electrically charged particles as avatars of new physics. Currently, MoEDAL has taken data at center-of-mass energies of 8 and 13 TeV and provides the world's best laboratory constraints on monopoles with magnetic charges ranging from two to five times the Dirac charge. The MoEDAL experiment's groundbreaking physics program of over 40 scenarios complements the larger ATLAS and CMS experiments. During the ongoing shutdown, MoEDAL has been planning and preparing several upgrades for Run-3, including the new MoEDAL-MAPP detector (MoEDAL Apparatus for Penetrating Particles) which is currently being planned and constructed. The aim of the MAPP detector is to expand MoEDAL's physics program by including searches for new mini-ionizing particles (mIPs) as well as new long-lived neutrals (LLPs), both of which are predicted by many well-motivated extensions of the SM. In particular, these particles arise in hidden sector models of dark matter. The goal of this talk is to summarize the new MoEDAL-MAPP detector and introduce its physics program through studies of its potential reach for mIPs and LLPs during Run-3 using two bench-marking models: mini-charged particles in dark QED and new LL scalar & vector portals to dark matter.

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