

Roadmap of Dark Matter models for Run 3



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The Triggerless Search for Exotic DM at Run-3 with the MoEDAL-MAPP Experiment [12+3]

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The MoEDAL-MAPP experiment at Run-3 incorporates the MoEDAL and MAPP-1 (MoEDAL Apparatus for Penetrating Particles) detectors deployed at IP8 and in the UA83 tunnel on the LHC Ring, respectively. The passive, triggerless, MoEDAL detector has been taking data at Run-1 and Run-2 and is a world leader in the direct search for Highly Ionizing Particles (HIPs) at a Collider. HIP avatars of new physics include several exotic dark matter candidates including magnetic monopoles, Q-balls, nuclearites, microscopic black-hole remnants and lepton-like multi-charged constituents of composite dark matter, etc.

The MAPP-1 detector is currently being installed on the LHC ring and is primarily designed to search for Weakly Ionizing Particle (WIPs) messengers of new physics. However, it also has sensitivity to very long-lived charged and neutral particles (LLPs) exemplars of physics beyond the Standard Model, decaying to charged and photonic states. The MAPP-1 data acquisition rate is low enough that all data can be stored subject to optional “software a trigger” cuts. In this sense MAPP-1 is triggerless. The MAPP-1 detector will also be used in the search for exotic DM messengers of new physics such as: millicharged particles, light neutralinos and sterile neutrinos.

Presenter: PINFOLD, James (University of Alberta (CA))

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