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The MoEDAL-MAPP Experiment at the LHC - Searching for Exotic Dark Matter at the LHC

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The MoEDAL experiment deployed at IP8 on the LHC ring was the first dedicated search experiment to take data at the LHC's Run-2 in 2015. It was designed to search for Highly Ionizing Particle (HIP) avatars of new physics such as magnetic monopoles, dyons, Q-balls, multiply charged particles, massive slowly moving charged particles and long-lived massive charged SUSY particles. This class of particles contribute a number of possible dark matter candidates. We shall report on our search for HIPs at LHC's Run-2.

The MoEDAL detector is being reinstalled for LHC's Run-3 to continue the search for electrically and magnetically charged HIPs. As part of this effort we will initiate the search for massive long-very lived SUSY particles to which MoEDAL has a competitive sensitivity. An upgrade to MoEDAL, the MoEDAL Apparatus for Penetrating Particles (MAPP), approved by CERN's Research Board is now the LHC's newest detector. The MAPP detector, positioned in UA83, expands the physics reach of MoEDAL to include sensitivity to feebly-charged particles with charge, or effective charge, as low as 10ˆ-3 e (where e is the electron charge). Also, the MAPP detector In conjunction with MoEDAL's trapping detector gives us a unique sensitivity to extremely long-lived charged particles. MAPP also has some sensitivity to long-lived neutral particles.

Additionally, we will very briefly report on the plans for the MAPP-2 upgrade to the MoEDAL-MAPP experiment for the High Luminosity LHC (HL-LHC). This detector is currently being deployed in the UGC1 gallery near to IP8. This phase of the experiment is designed to maximize MoEDAL-MAPP's sensitivity to very long-lived neutral messengers of physics beyond the Standard Model. We will discuss how the MAPP extensions to the MoEDAL detector allow MoEDAL to test a number of dark sector models and search for dark matter candidates in this arena.

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