



Canadian Association  
of Physicists

Association canadienne  
des physiciens et physiciennes

Contribution ID: 3658

Type: Oral (Non-Student) / Orale (non-étudiant(e))

## (I) The MoEDAL-MAPP Experiment at the LHC's Run-3 and Beyond.

*Tuesday 20 June 2023 14:15 (30 minutes)*

The MoEDAL experiment deployed at IP8 on the LHC ring was the first dedicated search experiment to take data at the LHC in 2010. 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 charge SUSY particles. We shall report on our search at LHC's Run-2 for Magnetic monopoles and dyons produced in p-p and photon-fusion and detail our most recent result in this arena: the search for magnetic monopoles via the Schwinger Mechanism in Pb-Pb collisions, recently published in Nature. The MoEDAL detector will be 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-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  $10^{-3} e$  (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 present on the plans for the MAPP-2 upgrade to the MoEDAL-MAPP experiment for the High Luminosity LHC (HL-LHC). We envisage that this detector will be 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.

### Keyword-1

MoEDAL,MAPP,LHC,RUN-3,HL-LHC

### Keyword-2

HIP,Monopole,FIP,mQP,LLP

### Keyword-3

SUSY,Dark sector, New Physics

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**Session Classification:** (PPD) T3-3 Discovering New Paths to Discovery: New Technologies and Methods to Uncover BSM Physics Symposium | Symposium sur les nouvelles technologies et méthodes pour découvrir la physique au delà du modèle standard (PPD)

**Track Classification:** Symposia Day (Tues. June 20) / Journée de symposiums (mardi, le 20 juin):  
Symposia Day (PPD - PPD) - Discovering New Paths to Discovery: New Technologies and Methods  
to Uncover BSM Physics | Découvrir de nouvelles voies vers la découverte : Nouvelles technologies et  
méthodes pour découvrir la physique au-delà du modèle standard