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The MoEDAL Experiment at the LHC - a New Light on the TeV Discovery Frontier.

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In 2010 the MoEDAL experiment at the Large Hadron Collider (LHC) was unanimously approved by CERN's Research Board to start data taking in 2015. MoEDAL is a pioneering experiment designed to search for highly ionizing avatars of new physics such as magnetic monopoles or massive (pseudo-)stable charged particles. Its groundbreaking physics program defines a number of scenarios that yield potentially revolutionary insights into such foundational questions as: are there extra dimensions or new symmetries; what is the mechanism for the generation of mass; does magnetic charge exist; what is the nature of dark matter; and, how did the big-bang develop. MoEDAL's purpose is to meet such far-reaching challenges at the frontier of the field.

The innovative MoEDAL detector - that was installed for the first time in the winter of 2014-15 - employs unconventional methodologies tuned to the prospect of discovery physics. The largely passive MoEDAL detector, deployed at Point 8 on the LHC ring, has a dual nature. First, it acts like a giant camera, comprised of nuclear track detectors - analyzed offline by ultra fast scanning microscopes - sensitive only to new physics. Second, it is uniquely able to trap the particle messengers of physics beyond the Standard Model for further study. MoEDAL's radiation environment is monitored by a state-of-the-art real-time TimePix pixel detector array. A new MoEDAL sub-detector to extend MoEDAL reach to millicharged, minimally ionizing, particles (MMIPs) is under study. Results from MoEDAL test deployments are now available.

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