

Search for Highly Ionising Particles in 13 TeV proton-proton collisions with the ATLAS Detector

Friday, 14 February 2025 12:00 (15 minutes)

It would be interesting to know how a particle could have only a single magnetic north (or south) pole. Dirac showed that magnetic monopoles are compatible with quantum mechanics, relating the fundamental magnetic charge to the smallest electric charge. Magnetic monopoles would restore the broken electric-magnetic duality in Maxwell's equations and are predicted by various theories aiming to unify the fundamental forces of nature.

The ATLAS detector at the Large Hadron Collider at CERN recorded 138 fb^{-1} of proton-proton collision data at $\sqrt{s} = 13 \text{ TeV}$ during the 2015-2018 data-taking period (Run 2), enabling some of the most stringent limits on beyond-the-standard-model physics. This presentation focuses on a search for magnetic monopoles and high-electric-charge objects (HECOs) using Run 2 data collected by a dedicated high-level trigger. Both magnetic monopoles and HECOs are highly ionising particles, and as such, they would deposit significant energy in the ATLAS detector. This talk will present the methodology used in the Run 2 analysis to search for magnetic monopoles and HECOs and the results, along with an overview of the planned approach for the upcoming Run 3 analysis.

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Session Classification: Morning 2 - Particle Physics

Track Classification: Particle Physics