Abstract Submitted
for the APR21 Meeting of
The American Physical Society

Constraints on Fractionally Charged Particles from CDMSlite

SUDIP POUDEL, University of South Dakota — While the Standard Model does not anticipate the existence of free particles with a fractional electric charge, fractionally charged particles (FCPs) have not been experimentally excluded. The Standard Model of particle physics does have quarks and antiquarks with $\pm 2e/3$ and $\pm e/3$ charges, but their strong interaction binds them inside unit-charged hadrons. Free fractionally charged particles are a feature of viable extensions to the Standard Model with extra U(1) gauge symmetries. I report the results of an analysis of CDMSlite Run 2 Period 1 data resulting in the first direct detection limits on cosmogenic FCPs with an electric charge as small as $e/10^8$ and the most stringent limit on vertical intensity for FCPs with an electric charge $\leq e/160$. This analysis is also the first to consider cosmogenic FCPs with a wide range of masses (5 MeV/c^2 - 100 TeV/c^2) and velocities ($\beta\gamma = 0.1$ - 10^6).

Sudip Poudel
University of South Dakota

Date submitted: 07 Jan 2021

Electronic form version 1.4