Contribution ID: **60** Type: **Oral Presentation**

Photons in Darkness

Tuesday, 27 July 2021 12:15 (15 minutes)

Several astronomical observations have revealed the existence of larger matter quantities which are thought to occupy 27% of the universe. Many hypotheses exist about the nature of these elusive dark matter particles. One of these hypotheses predicts the existence of a hypothetical dark photon. The unique signature of this particle can be searched for at the Large Hadron Collider (LHC) at CERN. A study is performed to determine the feasibility of this search in ATLAS. A theoretical model containing a vector-like quark is considered which decays into a top quark and a dark photon. The focus will be on the decay channel containing a leptonic top consisting of either an electron or muon. Signal and several background distributions for some key variables of this decay mode will also be presented. This proposed search could lead to detectable dark matter whilst simultaneously expanding our limited understanding thereof.

Apply to be considered for a student ; award (Yes / No)?

Yes

Level for award;(Hons, MSc, PhD, N/A)?

MSc

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Session Classification: Nuclear, Particle and Radiation Physics

Track Classification: Track B - Nuclear, Particle and Radiation Physics