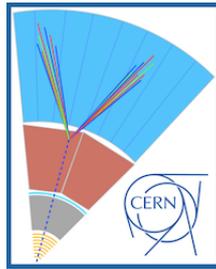


# Searching for long-lived particles at the LHC and beyond: Eighth workshop of the LHC LLP Community



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## Probing Dark Matter with Disappearing Tracks at the LHC (12'+3')

*Thursday 19 November 2020 14:15 (15 minutes)*

Models where dark matter is a part of an electroweak multiplet feature charged particles with macroscopic lifetimes due to the charged-neutral mass split of the order of pion mass. At the Large Hadron Collider, the ATLAS and CMS experiments will identify these charged particles as disappearing tracks, since they decay into a massive invisible dark matter candidate and a very soft charged Standard-Model particle which fails to pass the reconstruction

requirements. We have performed here the reinterpretation of the latest ATLAS disappearing track search for a suite of dark matter multiplets with different spins and electroweak quantum numbers. We consider the cases of the inert Two Higgs Doublet, Minimal Fermion Dark Matter and Vector Triplet Dark Matter models. Our procedure is validated by using the same wino and higgsino benchmark models employed by the ATLAS collaboration. We have found that with the disappearing track signature one can probe a vast portion of the parameter space, well beyond the reach of prompt missing energy searches (notably mono-jets). We provide the upper limits on the cross-section and efficiencies

in the lifetime - dark matter mass plane for all the models under consideration

which can be used for an easy recast for similar classes of models. Moreover we provide the recasting code employed here, as part of the public LLP Recasting Repository.

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