



Contribution ID: 40

Type: **not specified**

## A probe into leptophilic scalar dark matter

*Thursday 10 December 2020 15:30 (20 minutes)*

We revisit the scalar singlet dark matter (DM) scenario with a pair of dark lepton partners which form a vector-like Dirac fermionic doublet. The extra doublet couples with the SM leptonic doublet and the scalar singlet via a non-SM-like Yukawa structure. As a result, (1) since the extra fermionic states interact with other dark sector particles as well as the SM via gauge and Yukawa interactions, it gives rise to new DM annihilation processes including pair annihilation as well as coannihilation channels, allowed by the existing experimental constraints and (2) such a Yukawa structure opens up new production channels for leptonic final states giving much enhancement in cross sections to search for dark matter in the LHC. The DM freeze-out scenario becomes more interesting if a dark singlet fermion is added in the particle spectrum. In the cases of mixing between the charged dark leptons, the mixing angle gives rise to interesting features in DM coannihilation. It further dictates the dominant coannihilating partner from an ensemble of nearly degenerate dark leptons. We further show how the mixing leads to interesting signatures in the distributions of weak gauge boson mediated processes in a collider environment.

**Author:** Ms CHAKRABORTI, Sreemanti (Indian Institute of Technology, Guwahati, India)

**Co-author:** Dr ISLAM, Rashidul (Indian Institute of Technology Guwahati)

**Presenter:** Ms CHAKRABORTI, Sreemanti (Indian Institute of Technology, Guwahati, India)

**Session Classification:** Contributed talks