## Phenomenology 2021 Symposium



Contribution ID: 1353

Type: SUSY

## Supersymmetric minimal U(1)\_X model at the TeV scale with right-handed Majorana neutrino dark matter

Tuesday 25 May 2021 18:00 (15 minutes)

We propose a supersymmetric extension of the minimal  $U(1)_X$  model, along with a new  $Z_2$ -parity. One of the salient features of this model relates to how the  $U(1)_X$  gauge symmetry is broken at the TeV scale. The running of the Majorana coupling of the  $Z_2$ -even right handed neutrino is shown to become large due to radiative corrections. As a result, this running causes the mass squared of the corresponding right handed sneutrino to negative values and is ultimately responsible for breaking the gauge symmetry. By assigning one right-handed neutrino  $Z_2$ -odd parity, it can remain a viable dark matter (DM) candidate, despite R-parity being broken. Furthermore, the DM relic abundance receives an enhanced annihilation cross section due to the  $U(1)_X$  gauge boson (Z') resonance and is in agreement with the current observations. We have found a complementarity that exists between the observed DM relic abundance and search results for the Z' boson resonance at the Large Hadron Collider that further constrains the parameter space of our  $U(1)_X$  model.

## Summary

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Session Classification: Neutrino I