7th ComHEP: Colombian Meeting on High Energy Physics

Contribution ID: **57** Type: **Regular Talk (15'+5')**

Fermion and scalar two-component dark matter from a Z4 symmetry

Wednesday 30 November 2022 09:45 (20 minutes)

We revisit a two-component dark matter model in which the dark matter particles are a singlet fermion (ψ) and a singlet scalar (S), both stabilized by a single Z4 symmetry. The model is remarkably simple, with its phenomenology determined by just five parameters: the two dark matter masses and three dimensionless couplings. In fact, S interacts with the Standard Model particles via the usual Higgs portal, whereas ψ only interacts directly with S, via the Yukawa terms ψc¯(ys+ypγ5)ψS. We consider the two possible mass hierarchies among the dark matter particles, MS<Mψ and Mψ<MS, and numerically investigate the consistency of the model with current bounds. The main novelties of our analysis are the inclusion of the yp coupling, the update of the direct-detection limits, and a more detailed characterization of the viable parameter space. For dark matter masses below 1.3 TeV or so, we find that not only is the model compatible with all known constraints, but it also gives rise to observable signals in future dark matter experiments. Our results show that both dark matter particles may be observed in direct-detection experiments and that the most relevant indirect-detection channel is due to the annihilation of ψ. We also argue that this setup can be extended to other ZN symmetries and additional dark matter particles.

Author: Prof. YAGUNA, Carlos E. (UPTC)

Presenter: Prof. YAGUNA, Carlos E. (UPTC)

Session Classification: Dark Matter / Cosmology / Astroparticles

Track Classification: Dark Matter / Cosmology / Astroparticles