Contribution ID: **38** Type: **20 minutes talk**

A new scenario for singlet Dirac dark matter

Monday 2 December 2024 15:00 (25 minutes)

We propose a new and compact realization of singlet Dirac dark matter within the WIMP framework. Our model replaces the standard Z_2 stabilizing symmetry with a Z_6, and uses spontaneous symmetry breaking to generate the dark matter mass, resulting in a much simplified scenario for Dirac dark matter. Concretely, we extend the Standard Model (SM) with just two new particles, a Dirac fermion (the dark matter) and a real scalar, both charged under the Z_6 symmetry. After acquiring a vacuum expectation value, the scalar gives mass to the dark matter and mixes with the Higgs boson, providing the link between the dark sector and the SM particles. With only four free parameters, this new model is extremely simple and predictive. We study the dark matter density as a function of the model's free parameters and use a likelihood approach to determine its viable parameter space. Our results demonstrate that the dark matter mass can be as large as 6 TeV while remaining consistent with all known theoretical and experimental bounds. In addition, a large fraction of viable models turns out to lie within the sensitivity of future direct detection experiments, furnishing a promising way to test this appealing scenario.

Author: YAGUNA, Carlos E.

Presenter: YAGUNA, Carlos E.

Session Classification: Dark Matter