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Z6 −symmetric two-component scalar dark matter

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Multi-component scalar dark matter (DM) models based on a single Z_N (N 4) symmetry are simple and well-motivated. In this work, the phenomenology of a Z_6 model with two DM candidates is considered. The scalar sector of the Standard Model (SM) is extended with a second doublet and one complex singlet, both charged under the Z_6 symmetry. The ordinary SM fields remain neutral. The interactions allowed by the Z_6 give rise to processes between the DM particles that affect their relic densities and their detection prospects. By means of a random scan, the viable parameter space of the model is determined. Our results show that DM masses below the TeV scale are compatible with present data. Additionally, and despite the fact that the total DM abundance turns out to be dominated by the lighter component (the singlet), current and future direct detection experiments may be sensitive to signals from both DM particles.

Author: Dr ZAPATA, ÓSCAR

Co-author: RODRIGUEZ CIFUENTES, OSCAR ANDRES

Presenter: RODRIGUEZ CIFUENTES, OSCAR ANDRES