



Contribution ID: 30

Type: Talk

## A theoretical framework for multicomponent dark matter

*Thursday 5 December 2019 11:30 (20 minutes)*

We show that a single  $Z_N$  symmetry, which may be a remnant of a spontaneously broken  $U(1)$  gauge symmetry, allows to simultaneously stabilize several dark matter particles. We systematically study scenarios with various scalar fields charged under a  $Z_N$  and find that it is possible to get two ( $N \geq 4$ ), three ( $N \geq 6$ ), four ( $N \geq 8$ ), or even more dark matter (stable) particles. A generic feature of these models is that the number of stable particles is not determined by the model but depends on the relation between the masses of the different fields.

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