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Well-tempered n-plet dark matter

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The WIMP-paradigm tells us that a neutral particle with an EW cross-section and an electroweak-scale mass roughly explains the observed relic abundance. However, a closer look reveals that this correspondance is quantitatively not very precise since multi-TeV dark matter masses are reached for the simplest models, which is 1-2 orders of magnitude larger than the electroweak scale. But with an extended dark sector, it is possible to maintain the DM particle mass close to the electroweak scale and to keep the observed relic density.

I will talk about simple effective models of fermionic WIMP dark matter, where the dark matter candidate is a mixture of a Standard Model

singlet and an n-plet of $SU(2) \times U(1)$. The dark matter is assumed to be around the electroweak scale, and the mixing is generated

by higher-dimensional operators. I will focus on the observed relic density and direct detection constraints for $n = 3, 4$ and 5 .

Auteurs principaux: BHARUCHA, Aoife (CPT, Marseille); Dr BRUEMMER, Felix (LUPM Montpellier); M. RUFFAULT, Ronan (LUPM)

Orateur: M. RUFFAULT, Ronan (LUPM)

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