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New scalars as Dark Matter induced by Baryogenesis

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We live in a Universe with only matter and no antimatter and most theories of Baryogenesis imply that in the early Universe at temperatures above T > 160 GeV, all Standard Model states (but the W) had different numbers of particles and antiparticles. If there was a new symmetry in the dark sector and particles with quantum numbers in both the SM and the dark sector, then dark matter would also have an asymmetry which is directly related to the baryon asymmetry of the Universe. This is the well-known asymmetric dark matter scenario. However, most models of asymmetric dark matter are rather involved and/or hide some tunings. In this talk, I will present a new scenario that is simple, minimal, and consistent, featuring two new scalars: a SM singlet and a SM doublet, both charged under a new dark Z4 symmetry. We show that in this scenario dark matter abundance can be related to the baryon asymmetry. The dark matter necessarily needs to have M > 6 TeV, and while the scenario is already rather constrained, we show that the model will be definitely tested in a few years in direct detection experiments.

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