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Composite Dark Sectors

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We introduce a new paradigm in Composite Dark Sectors, where the full Standard Model (including the Higgs boson) is extended with a strongly-interacting composite sector with global symmetry group G spontaneously broken to H⊂G. We show that, under well-motivated conditions, the lightest neutral pseudo Nambu-Goldstone bosons are natural dark matter candidates for they are protected by a parity symmetry not even broken in the electroweak phase. These models are characterized by only two free parameters, namely the typical coupling gD and the scale fD of the composite sector, and are therefore very predictive. We consider in detail two minimal scenarios, SU(3)/[SU(2)×U(1)] and [SU(2)×SU(2)xU(1)]/[SU(2)×U(1)], which provide a dynamical realization of the Inert Doublet and Triplet models, respectively. We show that the radiatively-induced potential can be computed in a five-dimensional description with modified boundary conditions with respect to Composite Higgs models. Finally, the dark matter candidates are shown to be compatible, in a large region of the parameter space, with current bounds from dark matter searches as well as electroweak and collider constraints on new resonances.

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