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Low-energy effective description of dark Sp(4) theories

We consider a dark Sp(4) gauge theory with $N_f = 2$ fermions in the pseudo-real fundamental representation and construct the chiral low-energy effective theory. We determine the flavor multiplet structure and the chiral Lagrangian with the inclusion of the Wess-Zumino-Witten term for (non-)degenerate flavors. We provide implications when coupling to the Standard Model with a dark U(1) sector via its kinetic mixing with the hypercharge field strength, especially in view of dark matter stability. We use dedicated lattice simulations to determne the validity of the chiral low-energy effective theory and determine low-energy constants.

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