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Scattering of Dark Pions in Sp(4) gauge theory

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Analyzes of astrophysical data provide hints on the self-interactions of dark matter at low energies. Lattice calculations of strongly interacting dark matter (SIMP) theories are needed for motivating these models also from first principles. Sp(4) gauge theory with two fundamental fermions is a candidate SIMP theory. We compute the scattering phase shift for the scattering of two dark pions and determine the parameters of the effective range expansion. Our exploratory results in the supposedly most common interaction channel provide a lower limit for the dark matter mass when compared to astrophysical data. We also provide first benchmarks of velocity-weighted cross-sections in the relevant non-relativistic domain.

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