

Multi-dimensional optimization methods to analyze the null results of WIMP direct detection experiments with conservative bounds.

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To analyze WIMP of spin one half with a standard Maxwellian velocity distribution we calculate the maximal variation of the exclusion plot from the null results of 9 direct detection experiments. And the exclusion plot for each Wilson coefficient of the most general Galilean invariant WIMP nucleon effective Hamiltonian generalizes to a band delimited by the most constraining bound which corresponds to the maximal cancellation among the contribution of Wilson coefficients and that of all the other couplings of the effective theory. From 14 operators, multi-dimensionality is needed for Wilson coefficients that are 56 combination of contact and long range interaction with WIMP-proton and WIMP-neutron scattering. The variation of exclusion plot can reach 3 orders of magnitude and reduces to a factor as small as a few for the Wilson coefficients of the effective interactions where the WIMP couples to the nuclear spin. It is effective to combine the experiments using proton-odd and neutron-odd targets. An extremely high level of cancellation producing a question for the reliability of the result is required for some of the conservation bounds. By showing that it affects some of couplings driven by operators O1, O3, O11, O12 and O15, in particular the case of interference between contact and long range interaction, this issue is analyzed in a systematic way.

Secondary category for the parallel session (optional)

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