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Simple steps to analyse direct detection experiments without halo uncertainties

Tuesday 8 April 2014 15:00 (15 minutes)

Uncertainty in the local velocity distribution of dark matter is a key difficulty in the analysis of data from direct detection experiments. In my talk, I will propose a completely new approach for dealing with this uncertainty that does not involve any assumptions about astrophysics. By decomposing the dark matter velocity distribution into a sum of a large number of streams with different speeds and densities, we can find the velocity integral which best describes a given set of direct detection data for a hypothetical dark matter model. This method is conceptually simple, and numerically very efficient. I will discuss how to apply this method to estimate dark matter parameters independent of astrophysical uncertainties, choosing the ratio of proton to neutron couplings of dark matter as an interesting example.

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