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Harnessing astrophysical uncertainties in the direct detection of dark matter

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In order to analyse data from direct detection experiments, it has previously been necessary to make assumptions about the dark matter (DM) speed distribution. However, it has been shown that for a future discovery, poor astrophysical assumptions may lead to a bias in the reconstructed DM mass and cross section. I will present a completely general parametrisation of the speed distribution which allows an unbiased measurement of the DM mass and, when combined with neutrino telescope data, of the DM cross section. As an added bonus, the method can be used to reconstruct the distribution function itself from future data, allowing us also to probe the dynamics and formation history of the Milky Way.

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