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Dark matter velocity spectrocopy

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Summary

Dark matter decays or annihilations that produce line-like spectra may be smoking-gun signals. However, even such distinctive signatures can be mimicked by astrophysical or instrumental causes. We show that velocity spectroscopy-the measurement of energy shifts induced by relative motion of source and observercan separate these three causes with minimal theoretical uncertainties. The principal obstacle has been energy resolution, but upcoming experiments will reach the required 0.1% level. We show some examples of this application.

Primary author: LAHA, Ranjan (Stanford University)Presenter: LAHA, Ranjan (Stanford University)Session Classification: Dark matter (indirect detection)

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