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LHC phenomenology of invisibly decaying dark matter "candidates": is what we observe dark matter?

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I will discuss LHC phenomenology of dark matter "candidates" which decay invisibly inside the detectors, proposing to test for this possibility by studying the effect of particle widths on the observable invariant mass distributions of the visible particles seen in the detector. I consider the simplest non-trivial case of a two-step two-body cascade decay and derive analytically the shapes of the invariant mass distributions, for generic values of the widths of the new particles. I demonstrate that the resulting distortion in the shape of the invariant mass distribution can be significant enough to measure the width of the dark matter "candidate", excluding it as the source of the cosmological dark matter.

Summary

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