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The Matrix Element Method applied to a Dark Matter problem

In this work, we demonstrate the use of the Matrix Element Method, a form of multivariate analysis, for the case of a resonance produced at the LHC that decays into a lepton and an invisible particle, such as a Dark Matter particle. We show that for simple topologies like single and pair production of semi-invisible decaying resonances, where little information is available, it is possible to measure the width, masses, and couplings of the dark sector. The Matrix Element Method is thus a powerful technique that should be more intensively used in new physics searches in the LHC era.

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