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Theory meets Experiment

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Dark Particles at the LHC: LHC-Friendly Dark Matter Characterization via Non-Linear EFT

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Conventional methods for elucidating the behavior of Dark Matter (DM), such as effective field theory (EFT) and simplified models, have inherent limitations, including their limited applicability in LHC searches for DM and lack of generality, respectively. In this study, we propose a hybrid formulation aimed at reconciling these shortcomings by addressing both generality and applicability at colliders. To this end, we introduce an EFT that incorporates DM and two scalar mediators, thereby enabling a richer phenomenology. Moreover, we formulate the theory in a non-linear phase, thereby allowing for additional representations of the scalar mediators.

To demonstrate the efficacy of this framework, we will present a comparative analysis with well-known simplified models during the talk.

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