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Mediator-Induced Decay Chains and Multijet Collider Signatures from Non-Minimal Dark Sectors

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If the dark sector contains multiple components with similar quantum numbers which communicate with the visible sector only through a mediator, then this mediator also generically gives rise to dark-sector decays, with heavier dark components decaying to lighter ones. Successive such decays lead to extended decay chains in which visible matter is also produced at every decay step. In this talk, I explore the collider consequences of such decay chains in the case in which the mediator couples to the quark sector of the Standard Model. I discuss the properties of the multi-jet signatures that arise in such scenarios and show that within relatively large regions of parameter space, these signatures are not excluded by existing monojet and multi-jet searches. Such decay cascades therefore represent a potential discovery route for multi-component dark sectors at current and future colliders.

Summary

Author: THOMAS, Brooks (Lafayette College)

Co-authors: KIM, Doojin (Texas A & M University (US)); SU, Shufang (University of Arizona); SONG, Huayang; DIENES, Keith (University of Arizona); YAYLALI, David (University of Arizona)

Presenter: THOMAS, Brooks (Lafayette College)

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