

Searching for Dark Matter with Semi-Visible Jets at CMS

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Most theories that predict dark matter production at colliders rely on weakly coupled dark matter and the existence of WIMPs, or weakly interacting massive particles; however, there can be dark matter signatures in colliders that emerge from strongly coupled dark matter. These signatures are varied, ranging from emerging jets to Stealth Dark Matter. Another possible signature is semi-visible jets. These occur if the dark sector is comprised of a strong-like structure with dark hadrons made up of dark quarks. Once produced, a heavy dark quark would then hadronize into stable dark “pions”, which leave the detector as dark matter, and unstable dark hadrons that shower and appear as SM hadronic showers. Since the true jet is made up of visible SM quarks and missing transverse energy closely aligned with the shower, the jet is called semi-visible. This presentation will discuss a Hidden Valley theory that results in such a signature, as well as a work-in-progress analysis by members of the CMS Collaboration trying to find this signature.

Primary author: FALLON, Colin

Presenter: FALLON, Colin

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