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Semi-visible jets, energy-based models, and self-supervision

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We present DarkCLR, a novel framework for detecting semi-visible jets at the LHC. DarkCLR uses a self-supervised contrastive-learning approach to create observables that are approximately invariant under relevant transformations. We use background-enhanced data to create a sensitive representation and evaluate the representations using a normalized autoencoder as a density estimator. Our results show a remarkable sensitivity for a wide range of semi-visible jets and are more robust than a supervised classifier trained on a specific signal.

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