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Searching for the DFSZ Axino in Collider Experiments

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Although a direct search for the QCD axion at colliders may not be viable due to the feebleness of the axion couplings to the standard model, collider experiments may be sensitive to signatures of the axino, the supersymmetric partner of the axion. The couplings of the axion and axino are related to the axion decay constant f_a, and so collider searches for the axino may be a way to set model-dependent limits on the QCD axion itself. We have extended the minimal supersymmetric standard model with the addition of Dine-Fischler-Srednicki-Zhitnitsky (DFSZ) axion using tools like SARAH and FeynRules. As a first test of this model implementation, we have simulated the case in which the axino is the lightest supersymmetric particle and thus appears in the decays of heavier supersymmetric particles to produce displaced vertex and missing energy signatures. We will discuss the sensitivity of ATLAS and CMS to such signatures in light of our simulation results.

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