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Charged Dark Matter in Supersymmetric Twin Higgs models

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Supersymmetric Twin Higgs models allow for naturally low electroweak scale without much fine-tuning. If the lightest supersymmetric particle resides in the twin sector, it could be charged under the unbroken twin electromagnetism. I will consider the twin stau as candidate for dark matter in these class of models. All experimental constraints, including self-interaction bounds, are satisfied for wide range of the parameters. However, future direct detection experiments such as LUX-ZEPELIN will probe most of the parameter space. The collider signature of this scenario is a light stau which could be observed at the LHC as a long-lived particle.

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