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Distinguishing nonstandard scalar and fermionic charged particles at future $e + e -$ collider

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We investigate the possibility to identify the nature of spin of exotic charged particles at the future $e + e -$ collider in $l \pm + 2j + E T$ final state choosing IDM and MSSM as examples for the new physics models with scalar and fermionic exotic charged particles, respectively. We choose four benchmarks for the mass parameters for a significant deviation from the SM $W + W -$ background. We find that the $\cos \theta$ of W boson constructed from jj pair and lepton have the potential to identify the MSSM signal compared to the IDM signal in longitudinally polarized initial beams. A more robust comparison is seen in the shape of the azimuthal angle of the W boson and charged lepton, which can identify the IDM signal further if the beams are transversely polarized.

Session

Beyond the Standard Model

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