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Measuring tau polarisation at the ILC

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Two fermion production at the International Linear Collider (ILC) allows sensitive searches for new physics, such as heavy gauge bosons Z′. Combining the ILC's polarized beams with measurement of the tau lepton polarization allow detailed probes of the chirality of new interactions beyond the Standard Model.
The tau polarization can be extracted by measuring the distribution of tau decay products. In this study, we have developed a new method which uses the impact parameter of tau decay products to fully reconstruct the tau leptons, including the invisible neutrino momentum, while being insensitive to the possible emission of unseen ISR. This allows optimal reconstruction of the tau spin orientation in order to best measure the polarization.

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