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A precise determination of top quark electroweak couplings at the ILC operating at 500 GeV

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Top quark production in the process $e^+e^- \rightarrow t\bar{t}$ at a future linear electron positron collider with polarised beams is a powerful tool to determine the scale of new physics. The presented study assumes a centre-of-mass energy of 500 GeV and an integrated luminosity of 500 fb⁻¹ equally shared between the incoming beam polarisations of $(P_{e^+}, P_{e^-}) = (+/-0.8, +/-0.3)$. Events are selected in which the top pair decays semi-leptonically. The study comprises the cross sections, the forward-backward asymmetry and the slope of the helicity angle asymmetry. The vector, axial vector and tensorial CP conserving couplings are separately determined for the photon and the Z⁰ component. The sensitivity to new physics would be dramatically improved with respect to that expected from the LHC for electroweak couplings.

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