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Probing space-time structure at new physics with polarized beams at ILC

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We approach the issue of the discovery of new physics at high energies associated with the proposed International Linear Collider in the presence of longitudinal as well as transverse electron and positron beam polarization. We determine the beam polarization dependence and the angular distribution of a particle of arbitrary spin in a one-particle inclusive final state produced in e+e- collisions through the interference of photon or Z amplitude with the amplitude from new interactions having arbitrary space-time structure. We thus extend the results of Dass and Ross proposed at the time of the discovery of neutral currents, to beyond the standard model currents. We also extend the case of e+ e- annihilation in the s-channel to the production of bosons due to t- and u-channel processes. Our work provides an approach to model-independent determination of the space-time structure of beyond the standard model interactions. We briefly discuss applications of the framework to popular extensions of the standard model, and demonstrate that our framework is general enough to account for certain results in the minimal supersymmetric standard model. We briefly remark on work in progress when more than one final state momentum and when final state spin are also detected.

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