Quasi-plane waves for spin 1 field in Lobachevsky space and a generalized helicity operator

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Spin 1 particle is investigated in 3-dimensional curved space of constant negative curvature. An extended helicity operator is defined and the variables are separated in a tetrad-based 10-dimensional Duffin-Kemmer equation in quasi cartesian coordinates. The problem is solved exactly in hypergeometric functions, the quantum states are determined by three quantum numbers. It is shown that Lobachevsky geometry acts effectively as a medium with simple reflecting properties. Transition to a massless case of electromagnetic field is performed.

Identification of sneutrino s-channel exchange signatures in R-parity violating SUSY at LC with polarized beams

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Numerous non-standard dynamics are described by contact-like effective interactions that can manifest themselves in electron-positron collisions only through deviations of the observables (cross sections, asymmetries) from the Standard Model predictions. If such a deviation were observed, it would be important to identify the actual source among the possible non-standard interactions as many different new physics scenarios may lead to very similar experimental signatures. We study the possibility of uniquely identifying the indirect (propagator) effects of spin-0 sneutrino exchange, as predicted by supersymmetric theories with R-parity violation, against other new physics scenarios in high-energy e^+e^-; annihilation into lepton pairs at the International Linear Collider. These competitive models are interactions based on gravity in large and in TeV-scale extra dimensions, anomalous gauge couplings, Z0 vector bosons and compositeness-inspired four-fermion contact interactions. To evaluate the identification reach on sneutrino exchange, we use as basic observable a double polarization asymmetry that is particularly suitable to directly test for such s-channel sneutrino exchange effects in the data analysis. The availability of both beams being polarized plays a crucial role in identifying the new physics scenario.