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A Search for Squarks of R_p-violating SUSY at HERA

H1 Collaboration

Abstract

A search for squarks of R-parity violating supersymmetry is performed in ep collisions at HERA using H1 1994 e^+ data. Direct single production of squarks of each generation by e^+-quark fusion via a Yukawa coupling λ' is considered. All possible R-parity violating decays and gauge decays of the squarks are taken into account. No significant deviation from the Standard Model predictions is found in the various multi-lepton and multi-jet final states studied and exclusion limits are derived. At 95% confidence level, the existence of first generation squarks is excluded for masses up to 240 GeV for coupling values $\lambda' \gtrsim \sqrt{4\pi\alpha_{em}}$. The limits obtained are shown to be only weakly dependent on the free parameters of the Minimal Supersymmetric Standard Model. Stop squarks are excluded for masses up to 138 GeV for coupling $\lambda' \times \cos\theta_t$ to e^+d pairs $\gtrsim 0.1 \times \sqrt{4\pi\alpha_{em}}$, where θ_t is the mass mixing angle.

Light stop squarks are furthermore searched for through pair production in γ-gluon fusion processes. No signal is observed and exclusion limits are derived. Masses in the range 9 to 24.4 GeV are excluded at 95% confidence level for $\lambda' \times \cos\theta_t > 10^{-4}$.

Plenary Sessions:
12. Searches for New Particles - P. Maettig
14. Supersymmetry and GUTS - G. Ross
Parallel Session: II Electroweak Interaction Physics
7. Tests of the Standard Model
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11. Supersymmetry and GUTS
13. Search for New Particles