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A Search for Leptoquarks at HERA

H1 Collaboration

Abstract

A search for leptoquarks at HERA was performed in H1 using 1994 e^+p data corresponding to an integrated luminosity of about 3 pb^{-1}. Single leptoquarks were searched for in direct positron-quark fusion processes taking into account possible decays into lepton-quark pairs of either the first, the second, or the third generation. No significant deviation from the Standard Model predictions is found in the various final states studied, and mass dependent exclusion limits are derived on the Yukawa couplings of the leptoquarks. Compared with earlier results from an analysis of e^-p data, exclusion limits are considerably improved for leptoquarks which could be produced via e^+-*valence quark* fusion. For leptoquarks with lepton flavour conserving couplings, masses up to 275 GeV (depending on the leptoquark type) are excluded for coupling values larger than $\sqrt{4\pi\alpha_{em}}$. For leptoquarks with lepton flavour violating couplings, masses up to 225 GeV are excluded for couplings with leptons of the second or third generation larger than $\sqrt{4\pi\alpha_{em}}$. Fourteen possible combinations of couplings are studied and stringent exclusion limits comparable or better than any existing direct or indirect limits are obtained for each leptoquark type.

Plenary Sessions:
9. Status of the Electroweak Interactions - A. Blondel, S. Pokorski
12. Searches for New Particles - P. Maettig
15. Non-supersymmetric Extensions of the Standard Model - K. Lane
Parallel Session: II Electroweak Interaction Physics
7. Tests of the Standard Model
Parallel Session: III Physics beyond the Standard Model
12. Non-supersymmetric extensions of the Standard Model
13. Search for New Particles