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A Search for Leptoquark Bosons in DIS at High Q^2 at HERA

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A search for new bosons possessing couplings to lepton-quark pairs is performed in the H1 experiment at HERA using 1994→1997 data corresponding to an integrated luminosity of 37 pb^{-1}. The very high Q^2 neutral (NC) and charged current (CC) data is compared to Standard Model expectations from deep inelastic scattering. The excess of events previously observed with the 1994→1996 data remains, although less significant. The analysis is extended to cover also any direct positron-quark fusion processes leading to decays into lepton-quark pairs of either the first, the second, or the third generation. No event $\mu + jet$ or $\tau + jet$ candidates are found to be compatible with two body decay hypothesis of a leptoquark. Assuming that the excess of NC-like events is due to a statistical fluctuation, the data is used to constrain the direct s-channel production of first generation leptoquarks. Compared with earlier results, the exclusion limits are considerably improved for leptoquarks which could be produced via e^+-*valence quark* fusion and extend far beyond the coupling-mass domain covered so far at other colliders for a small branching ratio in e^+q.