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Limits on the effective quark radius from inclusive ep scattering & contact interactions at HERA (15' + 5')

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The high-precision HERA data allows searches up to TeV scales for Beyond the Standard Model contributions to electron-quark scattering.

Combined H1 and ZEUS measurements of the inclusive deep inelastic cross sections in neutral and charged current ep scattering are considered, corresponding to a luminosity of around 1 fb^{-1} .

A new approach to the beyond the Standard Model analysis of the inclusive ep data is presented; simultaneous fits of parton distribution functions together with contributions of “new physics” processes are performed.

Considered are possible deviations from the Standard Model due to a finite radius of quarks, described within the quark form-factor model, or resulting from the new electron-quark interactions, in the framework of $eeqq$ contact interactions (CI). The resulting 95% C.L. upper limit on the effective quark radius is $0.43 \cdot 10^{-16} \text{ cm}$ and the limits on the CI mass scales, for different CI scenarios extend up to the 10 TeV scale.

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