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Vector Meson Electroproduction: a paradigm for Exclusive Physics at an Electron-Ion Collider

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Progress is reported with a phenomenological analysis in full view of chromodynamics of a plausible Bethe-Heitler-like approach to measurements of exclusive elastic and dissociative electroproduction cross sections for vector-meson (VM) "quarkonia" of different flavour, namely \rho(760), u ubar - d dbar, \phi(1019) s sbar, J\psi(3096) c cbar and \Upsilon(9460) b bbar . First results are presented in the form of acceptable fits to measurements made by the H1 and Zeus experiments at the HERA electron-proton collider of the cross sections. The Bethe-Heitler-like hypothesis includes the factorisable, flavor-dependent,

combination of quark-antiquark contributions which describe measurements of real and virtual photon structure ($F_2^{}$ gamma*), together with the appropriate, and universal, Regge-asymptotic form for flavour-blind, elastic, quark-proton (qp) scattering which is based analyticity and on measurements

of the proton structure function F_2 at appropriate Bjørken–x. The measurements are well described with constituent masses of u, d, s, c and b quarks and flavour-blind qp scattering for which the Regge-asymptotic expansion is truncated at one leading pole with intercept consistent with that which tradition demands is called a "pomeron" and which depends on the "length" of elastic scattering. The pomeron is thus seen both to be at work at a scale which is below that of the interacting proton, that is of confinement, and, provided that account is taken of the "length" of scattering, to be universal.

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