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**General-mass treatment for deep inelastic scattering at NNLO in CTEQ PDF analysis** MARCO GUZZI, Southern Methodist University, HUNGLIANG LAI, PAVEL M. NADOLSKY, C.-P. YUAN — We present an NNLO realization of the general mass scheme S-ACOT- $\chi$  for the treatment of heavy-flavour production in neutral current deep-inelastic scattering. Practical implementation of the NNLO calculation is illustrated on the example of semi-inclusive structure functions  $F_{2c}(x, Q)$  and  $F_{Lc}(x, Q)$ . In a modern global QCD analysis of parton distribution functions (PDFs), several factors are comparable in magnitude to next-to-next-to-leading order (NNLO) radiative contributions in the QCD coupling strength  $\alpha_s$ . Among these factors, dependence of QCD cross sections on masses of heavy quarks,  $m_c$  and  $m_b$ , can be significant. Global fits are sensitive to two types of mass effects, kinematical suppression of production of c and b quarks near respective mass thresholds in deep inelastic scattering (DIS), and large radiative contributions to collinear production of  $\bar{c}c$  or  $\bar{b}b$  pairs at large collider energy. It is therefore natural to evaluate all fitted cross sections in a “general-mass” (GM) factorization scheme, which assumes that the number of (nearly) massless quark flavors varies with energy, and at the same time includes dependence on heavy-quark masses in relevant kinematical regions. The S-ACOT- $\chi$  scheme that we present, is motivated by the QCD factorization theorem for DIS with massive quarks and we show it is valid to all orders of  $\alpha_s$ .

Marco Guzzi  
Southern Methodist University

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