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Diphoton production at Tevatron and the LHC in the NLO* approximation of the Parton Reggeization Approach

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The hadroproduction of prompt isolated photon pairs at high energies is studied in the NLO* framework of the Parton Reggeization Approach. The real part of the NLO corrections is computed, and the procedure for the subtraction of double counting between real parton emissions in the hard-scattering matrix element and unintegrated PDF is constructed for the amplitudes with Reggeized quarks in the initial state. The matrix element of the important NNLO subprocess RR->2gamma with full dependence on the transverse momenta of the initial-state Reggeized gluons is obtained. We compare obtained numerical results with diphoton spectra measured at Tevatron and the LHC, and find a good agreement of our predictions with experimental data at the high values of diphoton transverse momentum, pT, and especially at the pT larger than the diphoton invariant mass, M. In this multi-Regge kinematics region, the NLO correction is strongly suppressed, demonstrating the self-consistency of the Parton Reggeization Approach.

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