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Production of three isolated photons in the high-energy factorization approach

We study production of three isolated photons at the energy of Large Hadron Collider [1] in the Parton Reggeization Approach [2,3], which is based on high-energy factorization, Lipatov effective theory [4] and new unintegrated PDFs, obtained in modified multi-Regge kinematics approximation for QCD scattering amplitudes [5]. It is shown that data from ATLAS Collaboration can be described after merging of LO and NLO in strong coupling constant contributions, which are going via partonic subprocesses, $Q + \bar{Q} \to 3\gamma$ and $Q + R \to 3\gamma + q$, where R is the Reggeized gluon and $Q(\bar{Q})$ is the Reggeized quark (antiquark). We found that contribution of subprocess $Q + \bar{Q} \to 3\gamma + g$ is very small. We demonstrate also agreement between calculation with analytical amplitudes obtained via Feynman rules of the Lipatov effective theory and calculation using Monte-Carlo generator Katie [6].

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