

Future studies of exclusive diffractive bremsstrahlung of one and two photons

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We evaluate the cross section for diffractive bremsstrahlung of a single photon in the $pp \rightarrow pp\gamma$ reaction at high energies and at forward photon rapidities. Several differential distributions, for instance, the rapidity, the absolute value of the transverse momentum, and the energy of the photon are presented. We discuss also azimuthal correlations between outgoing particles. We compare the results for our complete approach, based on QFT and the tensor-Pomeron model, with two versions of soft-photon approximations where the radiative amplitudes contain only the leading terms. We discuss also the possibility of a measurement of two-photon-bremsstrahlung in the $pp \rightarrow pp\gamma\gamma$ reaction. In our calculations we impose a cut on the relative energy loss of the protons where measurements by the ATLAS Forward Proton detectors are possible. Our predictions can be verified by ATLAS and LHCf combined experiments. We discuss also the role of the $pp \rightarrow pp\pi^0$ background.

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