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Multiple Partonic Interactions in Production of Photons, Mesons, and Jets in Proton–Proton Collisions at the LHC

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Production of real and virtual photons in coincidence with jets, J/psi - mesons and jets, and phi-meson pairs is studied at the LHC energies. Calculations for prompt-photon and lepton-pair production are performed at NLO accuracy with the help of aMC@NLO and MadGraph. Processes of mesons production in proton-proton scattering are simulated using Pythia 8. Computed cross sections are compared with results of the experiments at the LHC. Influence of the multiparton interactions (MPI) on the observables, obtained both in the central and forward regions, is analyzed. MPI effects are taken into account in the framework of HERWIG and Pythia event generators. Manifestation of MPI in the reactions is also considered in calculation at LO with Sherpa. Sensitivity of the cross sections on parton distribution functions (PDFs), in particular gluon PDFs, is discussed. Computations for processes that result in creation of 2 gammas + 2 jets are in progress.

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