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Production of W^+W^- pairs via subleading processes at the LHC

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The standard NLO calculations underpredict the measured rates of W^+W^- production compared to recent ATLAS and CMS experimental data.
We discuss new subleading processes for inclusive production of W^+W^- pairs.
We focus on photon-photon induced processes.
We include elastic-elastic, elastic-inelastic, inelastic-elastic and inelastic-inelastic contributions.
The inelastic photon distributions in the proton are calculated in two different ways: naive approach used already in the literature and using photon distributions by solving special evolution equation with photon being a parton in the proton.
The results strongly depend on the approach used.
We calculate also contributions with resolved photons.
%The diffractive components have similar characteristics as
%the photon-photon elastic-inelastic and inelastic-elastic mechanisms.
The subleading contributions are compared with the well known $q\bar{q}$ and gg as well as with double-parton scattering contributions.
Predictions for the total cross section and differential distributions in W- boson rapidity and transverse momentum as well as WW invariant mass are presented. The $\gamma\gamma$ components constitute only about 1-2 \% of the inclusive W^+W^- cross section but about 10 \% at large $W^{\pm}$ transverse momenta.
We calculate also cross section for single-diffractive production of W^+W^- pairs including pomeron and subleading reggeon exchanges in the Ingelman-Schlein model. The H1 diffractive parton distributions are used in the calculations. The results are compared to the results of elastic-inelastic (inelastic-elastic) $\gamma\gamma$ processes.

M. Luszczak, A. Szczurek, arXiv:hep-ph/1309.7201

Primary authors: SZCZUREK, Antoni (Institute of Nuclear Physics); LUSZCZAK, Marta (University of Rzeszow)

Presenter: LUSZCZAK, Marta (University of Rzeszow)

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