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New mechanisms in the production of two J/ψ quarkonia in proton-proton scattering at the LHC.

Saturday, 8 July 2017 10:30 (15 minutes)

The presentation will be based on our paper in preparation [1].
We discuss production of pairs of J/ψ in pp collisions in the context
of recent results obatained at the LHC at large transverse momenta.
The leading-order $O(\alpha_s^4)$ contribution
is calculated in both collinear and the k_t-factorization approach
with the KMR UGDF.
We include also two-gluon exchange contribution
($O(\alpha_s^6)$) (not included routinely).
This contribution is calculated only in the collinear approximation.
In addition we calculate cross sections for
$pp \to \chi_c(J_1)\chi_c(J_2)$.
A feed-down from double χ_c production to double J/ψ
production is estimated for a first time.
The double parton scattering cross section and differential
distributions are calculated using a parametrization
of experimental J/ψ differential distributions in rapidity
and transverse momentum.
Results of our calculations are compared with very recent ATLAS data [2].
We find that the two-gluon exchange mechanism and feed down from
double χ_c production lead to very similar
distributions in rapidity distance between the J/ψ
mesons as for DPS.
Much larger cross sections are obtained in the k_t-factorization approach.
Including the mechanisms leaves much less room for the DPS contribution which cannot be calculated from first principle.
The σ_{eff} parameter for DPS needed to describe the ATLAS data
is much larger than from previous analyses of double
quarkonium production, where a smaller number of mechanisms was included.
We present distributions in rapidity distance, two J/ψ invariant
mass, azimuthal angle correlations between the two J/ψ mesons
and transverse momentum of the pairs of quarkonia.
Ihe sum of the four considered contributions reminds
experimental ATLAS distributions.

1) A. Cisek, W. Sch\"afer and A. Szczurek, a paper in preparation.

2) ATLAS collaboration,
CERN-EP-2016-211, arXiv:161202950.

Experimental Collaboration

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