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χ_c pair production with large rapidity distance and extra gluon emission

Recently there has been much interest in the pair production of
quarkonia. The production of quarkonium pairs is expected to receive
an important contribution from double parton scattering (DPS) processes.
There remain a number of open problems, especially with the CMS and ATLAS data.
The effective cross sections $\sigma_{\rm eff}$ found
from empirical analyses are about a factor 2.5 smaller than the usually accepted
$\sigma_{\rm eff} = 15\,{\rm mb}$.
Here we discuss single-parton-scattering mechanisms that can mimic the behavior of
DPS induced production. Here especially the production of χ-pairs is important.
I will discuss the mechanism χ_c pair production with large rapidity separation.
Additionally extra gluon emission as an real high order correction to χ_c pair
production is taken into account. Virtual corrections are considered as well.
Several distribution for two $\chi_{c0}\chi_{c0}$, $\chi_{c1}\chi_{c1}$, $\chi_{c2}\chi_{c2}$
will be shown.

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