Simulation study of $\chi_c \rightarrow J/\psi + \gamma$ detection with $J/\psi \rightarrow e^+e^-$ in pp collisions in the ALICE experiment at LHC

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In the paper [1] we present Monte Carlo results about the feasibility to detect the χ_c family in p-p collisions at $\sqrt{s} = 14$ TeV in the ALICE Central Barrel at CERN LHC. In Sect. 7, an estimate of the number of reconstructed χ_c in a nominal pp run is given. For that estimate, the acceptance of the decay products (e^+ , e^- and γ) in ALICE is needed. We have discovered an inconsistency between the phase space considered for the efficiency and for the acceptance. The acceptance (given in Sect. 3) was calculated with the pseudorapidity of the decay products (e^+ , e^- and γ) constrained to $|\eta| < 1.2$, whereas the efficiency was calculated under a more restrictive requirement on the pseudorapidity of e^+e^- ,

namely $|\eta| < 0.9$. The χ_c acceptance implied by the analysis condition is 6.3% instead of 10%.

Taking into account the proper acceptance (6.3%), the maximum rate of observable χ_c is $0.74 \times 10^{-3} \text{ s}^{-1}$ instead of $1.2 \times 10^{-3} \text{ s}^{-1}$. The maximum number of reconstructed χ_c in a nominal pp run of 10^7 s would therefore be 7,400 instead of 12,000.

References

1. P. González et al. (the ALICE Collaboration), Simulation study of $\chi_c \rightarrow J/\psi + \gamma$ detection with $J/\psi \rightarrow e^+e^-$ in pp collisions in the ALICE experiment at LHC. Eur. Phys. J. C (2009). doi:10.1140/epjc/s10052-009-0895-4

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