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Charmonium production on fixed target with proton and lead beams of LHC

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Fixed target operation with proton and lead beams of LHC provides new possibilities for investigation of

The dissociation of heavy quark resonances by colour screening in a deconfined medium is one of the possible signature of Quark Gluon Plasma formation in high energy heavy ion collisions. Investigation of charmonium production by decay on two leptons (muons) was started at the CERN SPS [1], continued at RHIC [2,3] and now is going at LHC, CERN.
The theoretical models without regeneration that could reproduce SPS results produce too strong J/ψ suppression at RHIC energies. At LHC energy a process of charmonium production is different with respect to the SPS and even to the RHIC. The theoretical estimates give different results, some predict strong suppression [4], some predict enhancement [5]. In addition to prompt production from hard scattering, charmonium states could be produced due to recombination which may give an enhancement instead of a suppression.
The energy interval between SPS and RHIC is very important for a study of the mechanism of quarkonium production and suppression. If the proton and ion beams will be used at LHC with fixed targets, the energy for 7 TeV proton beam will be √ s = 114.6 GeV, for 2.75 TeV Pb beam √ s = 71.8 GeV.
In order to separate normal and anomalous charmonium suppression we need to have data for pp interaction and several target nuclei, which is easy to do with fixed target and very hard with colliding beams.
As it was already used for the experiment on collider with a fixed target at HERA-B, the target in the form of thin ribbon could be placed around the main orbit of LHC. The life time of the beam is determined by the beam-beam and beam-gas interactions. Therefore after some time the particles will leave the main orbit and interact with the target ribbon. So for fixed target measurements only halo of the beam will be used and no deterioration of the main beam will be introduced. The experiments at different interaction points will not feel any presence of the fixed target.
In order to study a capability of using the fixed target at LHC for charmonium production we calculate geometrical acceptances for J/ψ production, compare acceptances at collider experiments (RHIC and LHC) with existing fixed target experiments. Then we estimate the counting rates and show that J/ψ production on fixed target at LHC could be measured with rather high statistics collected in several days of data taking.

[1] L. Kluberg, Eur. Phys. J. C 43, 145 (2005).
[2] PHENIX Collab. (A. Adare et al.), Phys. Rev. Lett. 98, 232301 (2007).
[3] M. J. Leitch, J. Phys. G 34, S453 (2007).
[4] R. L. Thews et al., Eur. Phys. J. C 43, 97 (2005).
[5] A.Andronic, P.Braun-Munzinger, K.Redlich, J.Stachel, Phys. Lett. B571, 36-44 (2003).

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