XXIV QUARK MATTER DARMSTADT 2014

Contribution ID: **456** Type: **Poster**

Measurement of the inelastic proton-lead cross section at 5.02 TeV/nucleon center-of-mass energy with CMS

Tuesday 20 May 2014 16:30 (2 hours)

Total cross sections in pp, $p\bar{p}$, ep collisions at high energies have been described in terms of pomeron exchange. Their increase with energy depends on the parton evolution mechanism. Proton-nucleus cross sections have so far only been measured in fixed-target or cosmic-ray experiments. CMS has measured the total inelastic proton-lead cross-section by detecting activity in the forward calorimeters. The luminosity determination is based on van der Meer scans with a precision of 3.5%. The cross section visible within the CMS acceptance is extrapolated to the full phase space yielding the value of 2.06±0.08 barns at 5.02 TeV/nucleon center-of-mass energy. Using the previously measured cross section of pp collisions, this result is used to test the Glauber model at TeV energies. Implications for cosmic ray studies will also be discussed.

On behalf of collaboration:

CMS

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Session Classification: Poster session

Track Classification: Initial State Physics