



Contribution ID: 157

Type: **not specified**

New results for ultraperipheral heavy ion collisions

Wednesday, 7 September 2016 18:55 (25 minutes)

We shall discuss two reactions:

$AA \rightarrow AA\gamma\gamma$ and $AA \rightarrow AAe^+e^-e^+e^-$.

In the first case we shall discuss connections with elastic

$\gamma\gamma$ scattering. Several mechanisms are included:

lepton and quark boxes, vector-dominance mechanism and two-gluon exchange mechanism.

The calculations are done in the equivalent photon approximation

in the impact parameter space (EPA-b). Several differential distributions are calculated.

Feasibility studies will be presented. Measurable counting

rates are obtained. A special attention is devoted to

searches for hints of the VDM-Regge mechanism as well as two-gluon exchange one.

The studies show that first identification/measurement of elastic $\gamma\gamma$

scattering is accessible with present experimental infrastructure.

The expected number of events will be given.

In the second case of four-lepton production we consider only double scattering

$\gamma\gamma \rightarrow e^+e^-$ mechanism. As in the first case

the calculation are done in the EPA-b. We present several differential

distributions imposing experimental cuts on rapidities and transverse momenta

relevant for different experiments at the LHC. Corresponding number of counts

will be given. Our study show that corresponding measurements

should be possible soon and would allow a first identification

of the double scattering mechanism.

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Session Classification: Diffraction in nuclear collisions (II)

Track Classification: Diffraction in nuclear physics