Introductory remarks

on ultraperipheral heavy ion collisions (UPC)

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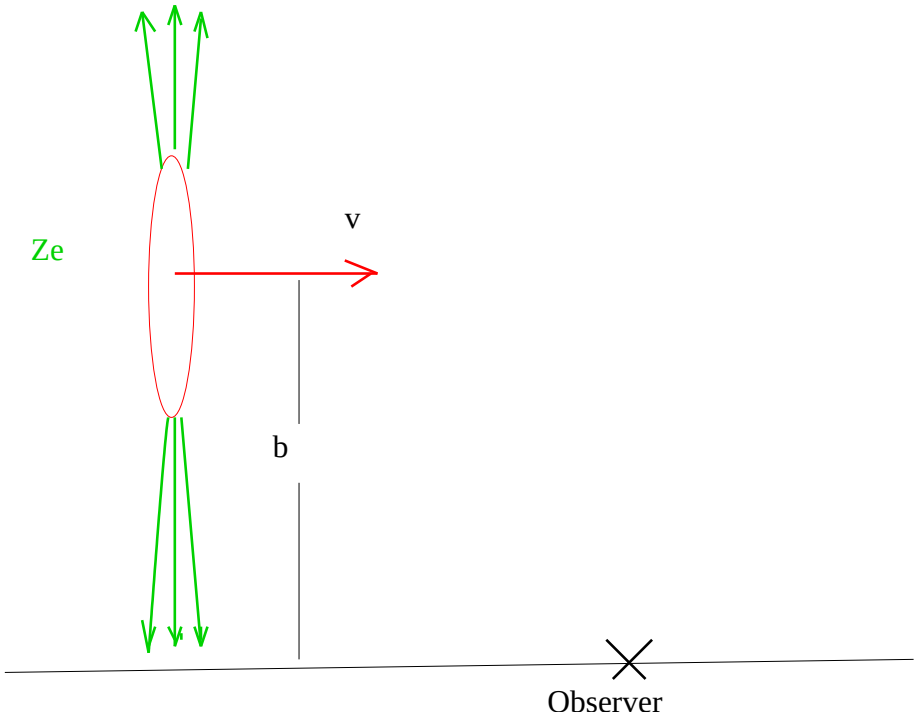
Ultraperipheral Collisions



From Fermi ('equivalent photons', 1924) and Weizsäcker-Williams to 'The Physics of Ultraperipheral Collisions at the LHC'

arXiv:0706.3356, submitted to Journal of Physics G, Topical Review

UPC: nuclei do not touch each other $\rightarrow$ only electromagnetic interaction between the ions, $b > \text{sum of nuclear radii}$

Strong electromagnetic field $E_{max} \sim \frac{Ze}{b^2}\gamma$: exchange of many photons in one collision

short time: $\tau_{\text{collision}} \sim \frac{b}{\gamma v}$: the equivalent photon spectrum extends up to energies hitherto unexplored

huge cross sections for soft processes: both useful and a nuisance

nuclear excitations: well known from lower energy nucleus-nucleus collisions ('Coulomb excitation', below and above the Coulomb barrier)

trigger on UPC and source of beam loss at LHC(Pb-Pb)

processes at higher photon energies of fundamental interest:

vector meson production, photon-gluon fusion,...

M. Strikman: 'HERA III'

restricted to $Q^2 < 1/R^2$: quasireal $\gamma + A$ interactions

Pb-Pb: experiments are planned at ALICE, CMS and ATLAS, complementing the studies of central collisions (Quark-Gluon-Plasma,...)

pp: possibility of tagging by measuring energy loss of forward protons

$\rightarrow$ γ+proton- and $\gamma\gamma$ -studies at the highest energies

Coming next

Joakim Nystrand: RHIC and ALICE

Janet Seger: STAR/RHIC

David D'Enterria: RHIC and CMS

Severine Ovyn: LHC/pp (γp)

Tomasz Pierzchala: LHC/pp ($\gamma\gamma$)

James L. Pinfold: Tevatron/CDF

Wednesday 18:20-18:40: Valeri Pozdnyakov ATLAS