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Exciting Ions: a Complete Treatment of Ultrapерipheral Collisions with Nuclear Breakup

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In the high energy heavy ion collisions the ions can act as intense sources of electromagnetic radiation, or in the language of particle physics, photon-photon collisions. This is in particular the case for so-called ultraperipheral collisions (UPCs), where the impact parameter separation of the ions is significantly larger than the range of QCD, with the ions remaining intact after the collision. This production mechanism is a key ingredient in the LHC precision and discovery programme, providing a unique probe of physics within and beyond the Standard Model. However, in order to facilitate this, a precise theoretical treatment of the underlying process is mandatory. In this talk I will present an update to the SuperChic Monte Carlo generator, which provides such a treatment. A full account of mutual ion-ion electromagnetic dissociation is now in particular provided, including its full kinematic dependence. This dissociation is rather common in UPCs, and indeed can be measured in the collider with dedicated zero degree calorimeter (ZDC) detectors. Moreover, it will in general modify the predicted kinematic distributions in the central detector, as well as the cross section. I will compare to recent data from the LHC and RHIC, and discuss the outlook for the future.

Submitted on behalf of a Collaboration?

No

Participate in poster competition?

No

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