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A generator of forward neutrons for ultra-peripheral collisions: nOOn

The study of photon-induced reactions in collisions of heavy nuclei at RHIC and the LHC has become an important direction of the research program of these facilities in recent years. In particular, the production of vector mesons in ultra-peripheral collisions (UPC) has been intensively studied. Owing to the intense photon fluxes, the two nuclei participating in such processes undergo electromagnetic dissociation producing neutrons at beam rapidities. Here, we introduce the nOOn (pronounced noon) Monte Carlo program, which generates events containing such neutrons. nOOn is a ROOT based program that can be interfaced with existing generators of vector meson production in UPC or with theoretical calculations of such photonuclear processes.

In this talk we will present latest developments on the program, particularly the extension to new nuclei (gold, oxygen or uranium). Framework developed to deal with datasets for various nuclei opened a possibility to study variations of the output coming from usage of different photo-neutron (gamma+A->A'+Xn) cross sections. This is of particular interest because in UPC events the two fold ambiguity on the photon energy can be disentangled via the measurement of the forward neutron multiplicity. In the past several experimental groups performed a measurement of the photo-neutron cross section, but no agreement on a 'PDG-like' mean value exist in the field. Using nOOn we studied the uncertainty of the modified photon flux coming from usage of various datasets of the photo-neutron cross section. The variation of the fluxes due to this effect has to be taken into account when they are used in future experiments.

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