

Proton and neutron evaporation from excited ions in the light-by-light scattering process

In 2017, the ATLAS collaboration published an article that confirmed the experimental phenomenon of light-by-light scattering [1]. This process entails the creation of photon pairs as a consequence of the interaction between strong electromagnetic fields. The effect was successfully recorded through the intense photon flux generated during ultra-peripheral collisions of heavy ions. Two additional experimental results of light-by-light scattering were reported in the following years: one by the CMS collaboration [2] in 2018, and another by the ATLAS experiment [3] in 2019.

Light-by-light scattering is accompanied by the excitation of nuclei, which can result in the emission of nucleons from the nucleus. A similar effect is observed in processes such as ρ_0 meson photoproduction [4] or dimuon production [5]. Utilizing the formalism described in [6], the cross-section for light-by-light scattering accompanied by neutron emission was calculated. Furthermore, predictions prepared for the cross-section associated with proton emission, up to date unexplored for any other process, will be discussed. The developed results serve as a guiding framework for future experiments related to heavy-ion collisions, aimed at investigating light-by-light scattering.

Bibliography:

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