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Lepton pair photo-production in Ultra-peripheral and peripheral heavy ion collisions

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The lepton pair production in ultraperipheral collisions is studied in the classical field approximation. We derive a general form of the cross section in terms of photon distributions that depend on the transverse momentum and coordinate based on the wave packet form of nuclear wave functions. Such a general form of the cross section in the classical field approximation contains the results of the generalized equivalent photon approximation (EPA) as well as the corrections beyond EPA in the Born approximation. By rewriting the general form of the cross section in light-cone coordinates, we find a good connection with the transverse momentum dependent distribution factorization formalism in the Born approximation. Our numerical results are consistent with current experimental data. We also present the results for different centralities and the contributions from high order corrections.

Primary authors: WANG, Qun (University of Science and Technology of China); PU, Shi; WANG, Ren-jie (USTC)

Presenters: WANG, Qun (University of Science and Technology of China); PU, Shi; WANG, Ren-jie (USTC)

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