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Spin transfer and entanglement in Compton scattering

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Driven from the property that electrons in external laser beams can change their spin alignment even perpendicularly to the corresponding photon propagation direction [1,2], we are investigating the full spin-dependent interaction of the electron spin with the photon spin in Compton scattering. We are able to construct dynamics, in which the intrinsic angular momentum of photons and electrons along the photon propagation direction are not conserved for a specific kinetic setup of incoming and outgoing particle momenta [3]. To give a full picture of the process we also present the angle resolved cross section, Stokes parameters and spin expectation values. To the end we also discuss, how the dynamics can be used to establish entanglement between the photon polarization and the electron spin.

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- [2] S. Ahrens, H. Bauke, C. H. Keitel, C. Müller, Phys. Rev. A 88, 012115 (2013).
- [3] S. Ahrens, C.-P. Sun, Phys. Rev. A 96, 063407 (2017).

Primary author: Prof. AHRENS, Sven (Shanghai Normal University)

Co-author: Prof. SUN, Chang-Pu (Beijing Computational Science Research Center)

Presenter: Prof. AHRENS, Sven (Shanghai Normal University)

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