Polarization transfer in Rayleigh scattering by K-shell electrons

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Due to advances in coherent light sources and position sensitive x-ray detectors the polarization properties of photons elastically scattered by heavy atoms and ions have recently become experimentally accessible. In order to better understand possible future experiments a better theoretical knowledge of the polarization transfer in such Rayleigh scattering processes is required. In this contribution we present a theoretical analysis of polariz ation transfer between the incident and the elastically scattered photon.

To study such a transfer we used the Dirac equation and second order perturbation theory. Within this framework the computations were performed by expressing the relativistic states in terms of a finite basis set based on B-splines and B-polynomials.

Detailed calculations were conducted on the K-shell of H-like ions for a wide range of nuclear charges and photon energies. The role of relativistic effects and non-dipole electron photon interactions for different nuclear charges and photon energies are discussed in detail.

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