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Relativistic effects in highly charged heavy ions

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In electron-electron interactions in electromagnetic systems, retardation in the exchange of a virtual photon is essentially important as the first-order quantum electrodynamics correction. However, the retardation effect is generally so small that it is buried in unretarded electric and magnetic interactions and thus has yet to be directly probed. Here, we present a giant contribution of the retardation effect in an electron-electron interaction via observing strong electric-dipole-allowed radiative transition rates.
In this talk, we also present the investigation on the linear polarization of K-shell radiative recombination (RR) to highly charged bare and hydrogenlike ions. In particular, the spin-flip contribution on the polarization is studied through relativistic theoretical calculation. The experimental polarization obtained for Kr shows a better agreement with the simulation including the spin-flip contribution. It indicates that the spin-flip effect on the polarization of RR x-ray photons could be identified with the lightest element hitherto.

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