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Polarized electron correlations near auto-ionizing states of zinc atoms JAMES WILLIAMS[1], LUKA PRAVICA, SERGEY SAMARIN, University of Western Australia — Multi-electron metal atoms find new applications in diverse structures with spin and momentum-dependent properties having significance in determining material functionalities. Electron correlations effects are determined from scattering kinematics of spin-polarized electrons exciting zinc atoms near autoionizing states up to 16 eV. Previous studies of the $4p^{3,1}P_1$, $4d$,$5d$,$6d^3D_{1,2,3}$ and $4d$,$5d^1D_1$ excited states observed photon decay intensities and scattered electron energies and angles in the energy region of the $3d^94s^24p$autoionizing states up to 12 eV [1]. Strong electron correlations and active roles of $3d$electrons were evident. Our observations of the 5^3S excited state for electron energies up to 16 eV show dominant $3d$core-excited negative-ion resonances and strong Post-Collision Interaction (PCI). For low energies of scattered and ejected electrons, after near-threshold excitation of the $3d^94s^24p$autoionizing states, a large transfer of orbital angular momentum is evident. Results include angular differential elastic scattering and excitation functions, "integrated" Stokes polarization parameters and spin up/down asymmetries indicating spin-orbit interaction and electron exchange effects.

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