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Direct and indirect relativistic effect on electron scattering from cesium and gold atoms JUNFANG GAO, Physics Department of University of Missouri-Rolla, RENCHENG SHANG, WENNING PANG, Laboratory of Polarization Physics, Department of Physics, Tsinghua University, Beijing 100 084, People's Republic of China — The Stokes parameters, STU parameters and differential cross section (DCS) for electron scattering from a cesium atom are investigated by two kinds of distorted-wave methods. Each of them includes different relativistic effects. Comparing the results with those from the relativistic distorted-wave of the Toronto group, we found that the direct relativistic effect is stronger than the indirect relativistic effect for cesium atom scattering when the incident electron energy is 50 eV. We also noticed that it is the direct relativistic effect that causes the invalidity of the "fine-structure approximation" in this case. The Stokes parameters and DCS are also investigated for electron scattering from gold atom when the incident electron energy is 50 eV. On contrary to the case of electron scattering from cesium atom, the indirect relativistic effect is stronger than the direct relativistic effect in the case of electron scattering from gold atom. The qualitative physics interpretation of this phenomenon is that gold atom is heavier than cesium atom, so the electron speed in the gold atom is higher than that in cesium atom.

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