Electronic excitation of P-state of cadmium and zinc atoms

M. Piwiński [1], Ł. Kłosowski, D. Dziczek, S. Chwirot

Institute of Physics, Faculty of Physics, Astronomy and Informatics, Nicolaus Copernicus University in Toruń, Grudziądzka 5, 87-100 Toruń, Poland

Synopsis The electron-photon coincidence technique in coherence analysis version was used to study the electron impact excitation of first excited $^1P_1$ states of cadmium and zinc atoms. The experimental results of the Stokes and Electron Impact Coherence Parameters (EICPs) for various collision energies are compared and presented alongside CCC and RDWA theoretical predictions.

Atoms with two valence electrons outside an inert electron core are still interesting target for both experimental and theoretical electron-atom collision studies [1-4]. The collisional excitation process can be characterised using a set of the so-called Electron Impact Coherence Parameters [5]. The EICPs determining angular distributions of the electron charge cloud of the excited atoms can be obtained in electron-photon coincidence experiments [6-9]. However, due to experimental problems and long time consuming measurements there is only a limited number of the experimental data enabling verification of proposed theoretical models [10-12].

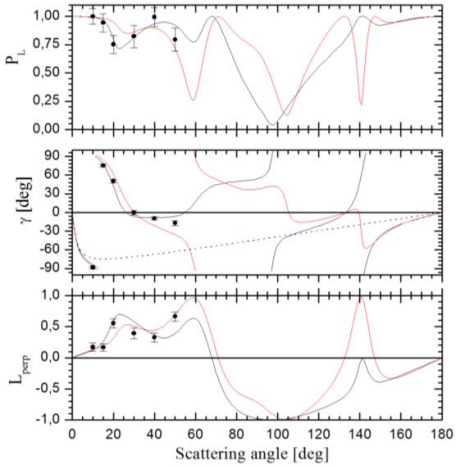

Figure 1. EICP (P_L, γ, L_{perp}) for electronic excitation (80 eV) of 5^1P_1 Cd state. Experimental data (•) are presented together with (—) CCC, (—) RDWA and (···) FBA theoretical predictions [10, 12].

We will present the values of Stokes and EICP parameters for excitation of the lowest singlet P-state of cadmium and zinc atoms [10,13,14]. The experiments were performed using electron-photon coincidence technique in the coherence analysis version. The data are presented with existing CCC [12] and RDWA [4] theoretical predictions.

[1] E-mail: Mariusz.Piwinski@fizyka.umk.pl

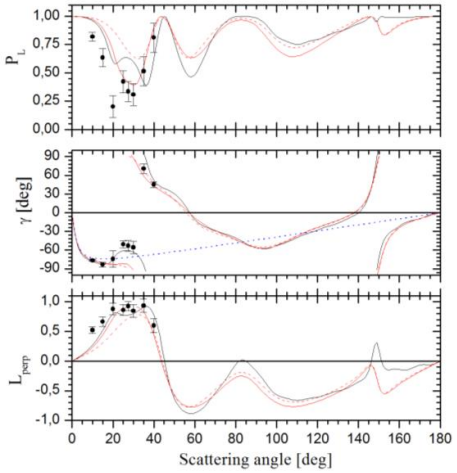

Figure 2. EICP (P_L, γ, L_{perp}) for electronic excitation (80 eV) of 4^1P_1 Zn state. Experimental data (•) are presented together with (—) CCC, (—) RDWA, (– –) SC RDWA and (···) FBA theoretical predictions [4,14].

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