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Book of Abstracts

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GENERALIZED OSCILLATOR STRENGTHS FOR ELECTRON SCATTERING BY In ATOM AT SMALL ANGLES

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We present results of measurements of generalized oscillator strengths (GOS) for the $^2P_{1/2} - {}^2S_{1/2}$ resonant transition of indium atom. Absolute values of GOS for the $^2S_{1/2}$ state of the indium atom are shown in Fig. 1 as a function of K^2 together with forward scattering function (FSF) for indium. The normalization has been achieved through displacing each data set of experimental GOS down until its $\theta=0^o$ point intersect the FSF(K^2) curve. We have used the (FSF) method introduced by Avodina et al. [1].

In this experiment we employed an electron spectrometer in crossed electron-atom beam arrangement. The experimental set-up consists of an oven, electron monochromator and analyzer situated in high-vacuum chamber. Indium vapor beam was produced by heating the oven crucible containing In metal (99,9% purity). Working temperature was approximately 1300 K and the metal-vapor pressure was about 10 Pa (0.07 Torr). For this experiment we made modifications on the design of the oven in order to achieve higher temperatures. External overheating was avoided by additional water cooling. These measurements were carried out for scattered electrons that had lost 3.022eV ($6s^2S_{1/2}$ state) at each 2 degrees from -10^o to +10^o. The angular scale was corrected for zero position. Then, angular dependencies of the scattering signal were multiplied by effective path length correction factors to get relative differential cross sections (DCS). We have applied the correction factors of Brinkman and Trajmar [4], modified for our experimental conditions.

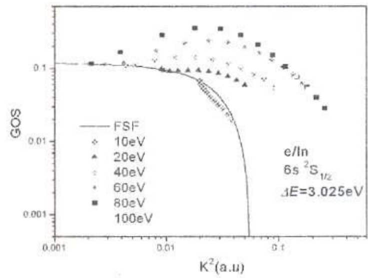

Fig 1. Generalized oscillator strengths for the $6s\ ^2S_{1/2}$ state of indium atom at 10, 20, 40, 60, 80 and 100eV impact energies.

Keywords: Generalized Oscillator Strengths, Differential Cross Sections.

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ELASTIC ELECTRON SCATTERING BY SILVER ATOMS

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Elastic electron scattering by silver atom has been investigated both experimentally and theoretically. Differential cross sections (DCSs) have been obtained in the intermediate impact electron energy range from 10 to 100 eV. The experimental method used to determine DCS is based on crossed beam technique where effusive atomic beam is perpendicularly crossed by monochromatic electron beam [1]. The well collimated effusive Ag vapour beam has been produced by heating oven crucible containing silver atoms by two resistive bifilar heaters. The elastically scattered electron intensities are detected as a function of scattering angle ranging from 10° to 150° and then converted to relative DCSs using the effective path length correction factors [2] determined for the present experimental conditions. The overall system energy resolution was 140 meV and the angular resolution was estimated to be 1.5°.

Corresponding theoretical results were obtained using the complex optical potential (OP) with the inclusion of spin-orbit interaction. The real part of this potential consists of static, local exchange, polarization and spin-orbit potentials [3]. The imaginary part of OP takes into account the absorption effects [4]. We have obtained DCSs values using two different approaches, i.e. calculations with (*SEPASo*-approximation) and without (*SEPSo*-approximation) absorption [3,4].

In Fig.1 our relative experimental DCS results at 100 eV impact electron energy are normalized at scattering angle of 40° to the present *SEPASo* calculations and presented with DCSs calculated using both *SEPASo*- and *SEPSo*-approximations. Other details as well as DCS results at 10, 20, 40, 60 and 80 eV will be presented at the conference.

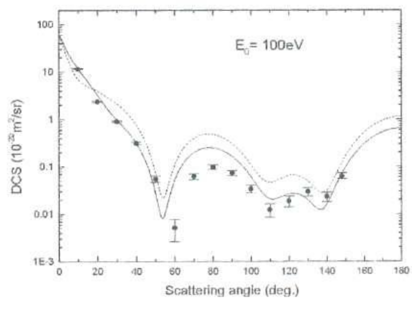

Fig. 1. Differential cross sections for the elastic electron scattering by silver atom at 100 eV incident electron energy: ●, experiment; —, *SEPASo*- approximation; ------, *SEPSo*-approximation.

Keywords: Differential cross sections; Elastic scattering; Silver

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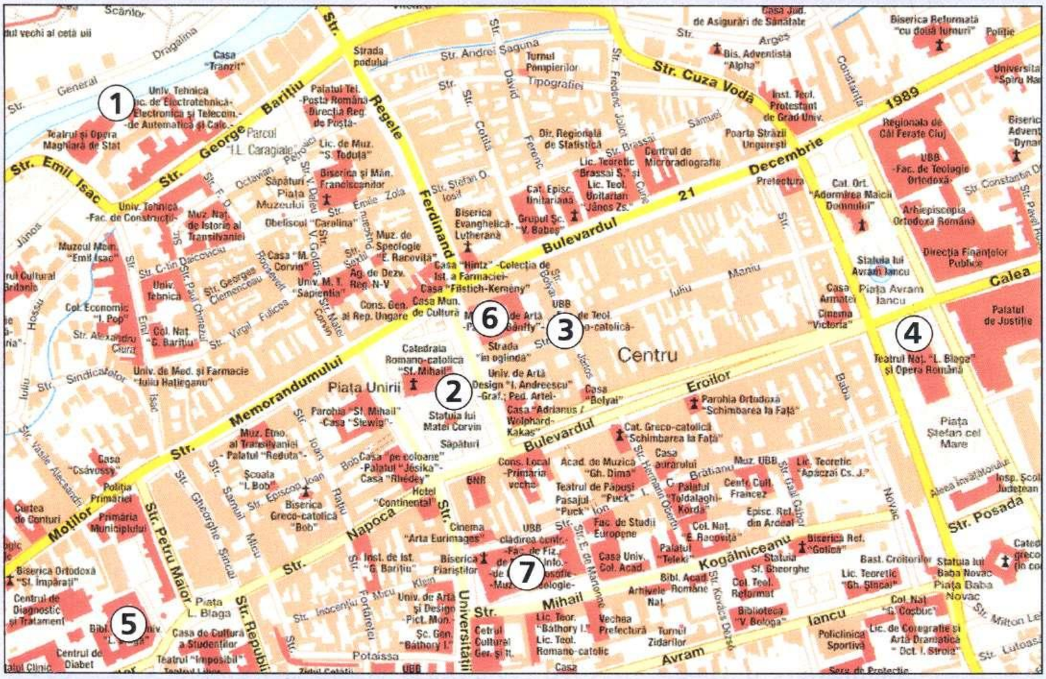

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