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THE CRITICAL POSITIONS OF DIFFERENTIAL CROSS SECTION MINIMA
IN ELASTIC ELECTRON - ARGON SCATTERING

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Determining of true positions of differential cross section (DCS) minima versus electron impact energy (E_0) and scattering angle (θ) is the challenge in experimental elastic electron - atom scattering investigations. We have performed our cross-beam experiment to measure elastic DCS on argon atom for E_0 from 10 to 100 eV, and θ up to 150° . Accurate determination of the energy scale via He 19.38 eV resonance and measurements around DCS minima using stepping motor, computer assisted, are provided.

The reason for the study of critical positions is that they are more sensitive test for the choice of model potential used in electron atom scattering calculations than DCS [1]. Also, at the vicinity of these positions, maximum of electron polarization is expected [2]. Also, our interest is oriented to the shape of DCS deep minima, which is convolution of true DCS profile and angular resolution function. It gives more information about the angular resolution in the experiments of this type.

Determination of the critical energy is established by measuring the relative cross section as a function of electron energy. Experimental points are fitted by parabolic curve [3]. We noticed [4] that theoretically and experimentally obtained positions of DCS minima in electron-argon elastic scattering are not always in satisfactory agreement. This is more pronounced in the case of the critical positions [5].

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