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# TH 006

## CRITICAL MINIMA IN ELASTIC ELECTRON SCATTERING BY ARGON

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We determined experimentally two critical points in elastic electron scattering by argon where the differential cross section (DSC) attains its smallest values. The points were found to be at 68.5°±0.3°, 41.30±0.02 eV and at 143.5°±0.3°, 37.30±0.02 eV. Special attention was given to improve the angular resolution in order to determine the exact positions of the minima. These minima are important because they are a sensitive test of the validity of experimental procedure, and are used to verify theoretical predictions of DCS shapes and magnitudes, and of the polarization of scattered electrons. Thus, our results can serve as reference for future calculations. Theoretical attention should be focused on the regions where the energy dependence of the angular position of the minima is greatest. In these cases one could expect an increased sensitivity of the calculations to the choice of the interaction potential.

Normalized DCS were determined by measuring the angular distributions of elastically scattered electrons at incident energies of 10, 15, 20, 25, 30, 40, 50, 60, 75, 80, 90, and 100 eV in the angular range from 20° to 150°. Results are compared with the available experimental and theoretical data. In addition, integral, momentum-transfer, and viscosity cross sections were determined by numerical intergration of the measured DCS extrapolated to 0° and to 180°.

At small scattering angles, present DCS data agree with the measurements of Williams and Willis.[1] Also, our results are consistent with the calculation of McEacharn and Stauffer.[2] The low-angle and high-angle minima are as deep as this theory predicts. At 60 eV our results show deeper minima than the available measurements due to our better angular resolution. Agreement in the minima positions with results calculated by Bartschat et al.[3] is very good.

Lucas[4] searched for critical points in electron-argon elastic scattering by compiling available results, while Kessler et al.[5] experimentally obtained preliminary results of critical points. To the best of our knowledge, results reported at a conference, have not been published in the final form. Two, out of three reported critical points, are in in the energy domain of present work. For our critical point at the low-angle minimum we found unsatisfactory agreement in both the position and energy at which the corresponding critical point appears, while for critical point at the high-angle minimum we found excellent agreement in the angular position, but our energy was 5 eV lower than that reported.[5]

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