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POSITION OF DCS MINIMA IN ELASTIC ELECTRON SCATTERING BY MERCURY

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From early measurements by Arnot[1], the change of minima positions in differential cross sections (DCS) versus energy was investigated in elastic electron -mercury collisions. Massey[2] has pointed out the significance of higher order phase shifts and he had compared DCS curves for mercury with the $[P_5(\cos\theta)]^2$ polynomials in which five minima occur.

Here we contrasted results from 9 experimental measurements and 5 theoretical calculations in the energy domain from 10 to 1000 eV. The exact determination of minima positions may serve as a sensitive test of experimental procedures as well as of theoretical predictions of DCSs shapes. In our measurements[3] from 15 to 100 eV impact we have observed only three minima while the other two show up at higher energies. Interesting feature is the disappearance of the first minimum at approximately 40 eV. Also, there is luck of data in energy regions between 60 and 100 eV where the second and the third minima rapidly change their positions, and between 200 and 300 eV where the fourth and the fifth minima separates from each other.

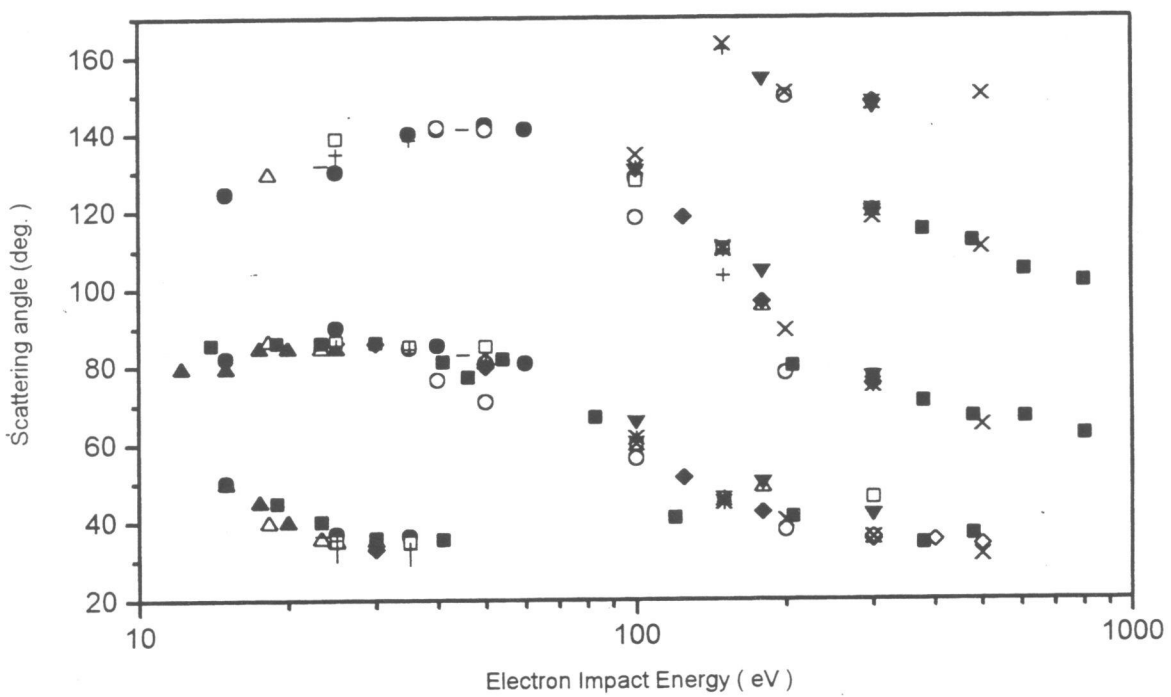

Figure 1. Positions of minima in electron elastic scattering by mercury. Present measurement is denoted by •; ■, Arnot *et al* `31; -, Deichsel *et al* `66; x, Walker `68; ◊, Bromberg `69; △, Eitel and Kessler `71; ○, Carse `72; ◆, Hanne *et al* `72; ▼, Yamazaki *et al* `77; ▫, Holtkamp *et al* `87; +, McEachran and Stauffer `87; |, Sienkiewicz `89; *, Pietzmann and Kessler `90; ▲, Zubek *et al* `95.

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2. H.Massey, in *Atomic and Molecular Collisions* Taylor & Francis Ltd. London (1979)

3. R.Panajotović, V.Pejčev, M.Konstantinović, D.Filipović, V.Bočvarski and B.Marinković *J.Phys.B* **26** (1993) 1005 and references therein.