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DIFFERENTIAL CROSS SECTIONS FOR INELASTIC SCATTERING OF INTERMEDIATE ENERGY ELECTRONS BY XENON ATOMS*

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Differential cross sections for inelastic scattering of electrons by xenon atoms are very important for a lot of applications. To our knowledge there are no available data in the literature. Because of that, we have applied similar procedure as described in argon contribution[1] and have determined values for intermediate energy electron scattering.

Elastic scattering of electrons has been measured at: 15,20,30,50,63 and 80 eV impact energies of electrons. Data are normalized to Register et al.[2] to the best agreement in the shape. Difference in the shape over all scattering angles between these two measurements at all impact energies is neglegible.

Tipical energy loss spectrum is shown in Figure 1. We measured differential cross sections for all peaks shown in the spectrum, although some of them contained more then one transition. For impact energies: 15,20,30 and 80 eV, we measured 12 inelastic differential cross sections. Correspondence of level numbers used in the present work with xenon spectral line designations is explained in Table 1. Differential cross sections for the strongest single transition 6s $[3/2]^{o}_{1}$ has been shown in Figure 2., at different impact energies.

One can see that at low impact energy curves are rather smooth and at 80 eV have a promeinent structure. Only values we can compare with, are the data of Williams et al.[3] at 20 eV impact energy. Difference in magnitude is very big because Williams et al. for normalization of their results used total cross section measurements from 1930's. Statistical errors are indicated in the figure. We estimate total

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error of our measurements and values will be presented together with results on the conference.

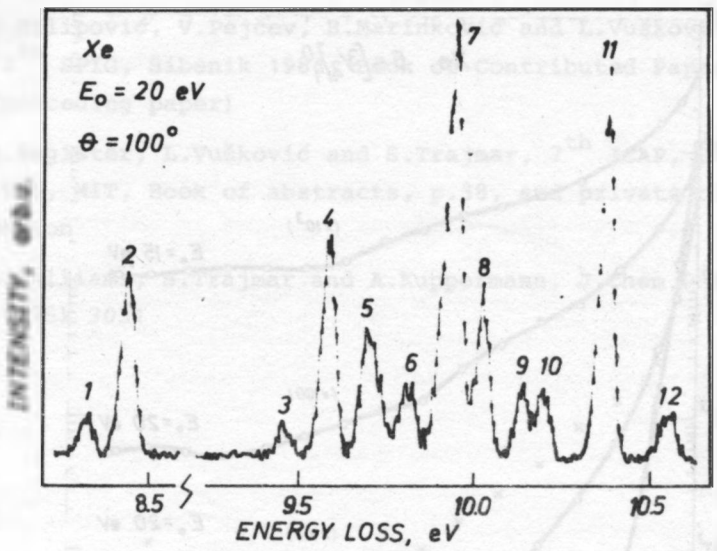

Fig.1. Energy loss spectrum of xenon

TABLE 1.

Number	Design.	Energy(eV)	Number	Design.	Energy(eV)
1	$6s\,[3/2]^o_2$	8.315	7	$6p\,[1/2]_0$	9.934
2	$6s\,[3/2]^o_1$	8.437		$5d\,[1/2]^o_0$	9.891
3	$6s'[1/2]^o_0$	9.447		$5d\,[1/2]^o_1$	9.917
4	$6s'[1/2]^o_1$	9.570		$5d\,[7/2]^o_4$	9.943
	$6p\,[1/2]_1$	9.580		$5d\,[3/2]^o_2$	9.959
5	$6p\,[5/2]_2$	9.686	8	$5d\,[7/2]^o_3$	10.039
	$6p\,[5/2]_3$	9.721	9	$5d\,[5/2]^o_2$	10.158
6	$6p\,[3/2]_1$	9.789	10	$5d\,[5/2]^o_3$	10.220
	$6p\,[3/2]_2$	9.821	11	$5d\,[3/2]^o_1$	10.401
			12	$7s\,[3/2]^o_2$	10.562
				$7s\,[3/2]^o_1$	10.593

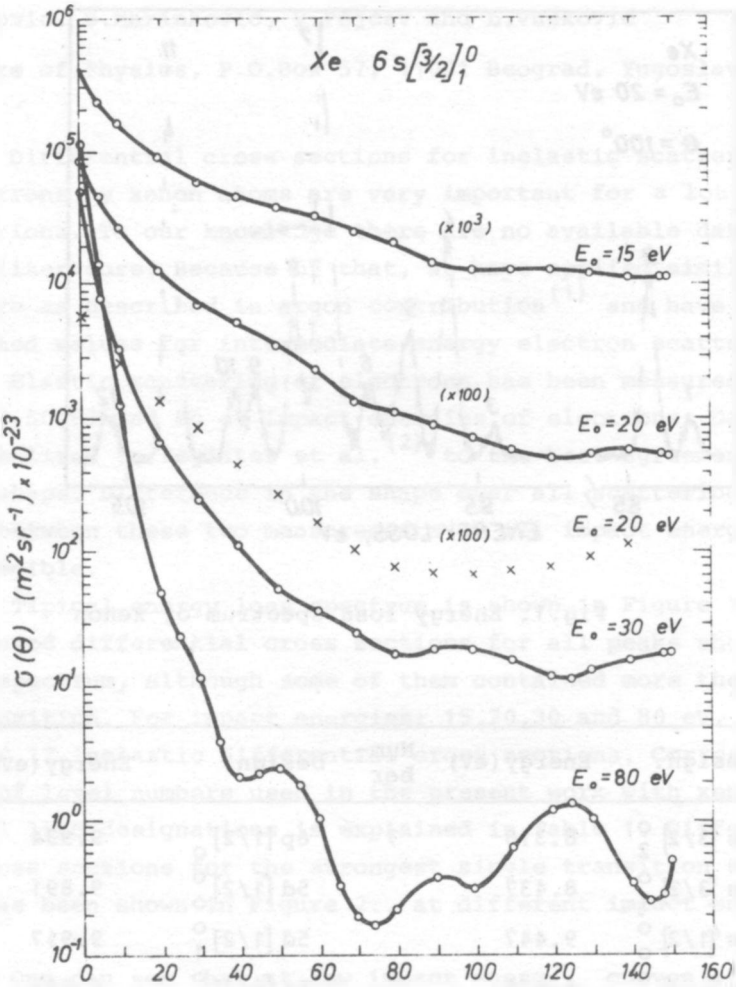

Fig. 2. Differential cross sections for transition $6s\,[3/2]_1^o$ at different impact energies. Circles connected with solid line (—o—) are present data, crosses (×) data of Williams et al. (Ref.3).

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