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RELATIVE DIFFERENTIAL CROSS SECTIONS FOR ELASTIC AND INELASTIC SCATTERING OF ELECTRONS BY XENON IN THE ENERGY RANGE OF 15 TO 80 eV

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A crossed electron - atom beam collision technique has been used to study the electron scattering by Xenon atoms. Relative differential cross sections (RDCS) for elastic and inelastic scattering have been measured at electron impact energies of 15, 20, 30 and 80 eV. In addition, only elastic scattering have been measured at 50 and 63 eV.

Typical energy-loss spectrum with inelastic features is shown in Fig. 1 with impact energy and scattering angle indicated. We studied inelastic region between 8.0 and 10.8 eV. Since the energy resolution of the spectrometer was approximately 40 mV, all transitions to individual states could not be resolved. Peaks indicated on Fig. 1 are explained in the Table. Similar spectra were obtained at other scattering angles ranging from 0° to 150° . From each spectrum ratio of the intensity of a spectral feature to the intensity of the transition $6s [3/2]_1^0$ was obtained. Special attention was paid in obtaining the angular distribution of the intensity of transitions $6s [3/2]_1^0$ and re-

sults are shown on Fig. 2. Ratios between this transition and elastic scattering for same impact energy has been determined in the separate experiment. So, all data of RDCS for elastic and inelastic scattering have the same relative units at each impact energy of electrons.

In order to put results on absolute scale calibration of elastic scattering is in progress in our laboratory. We compare our data with previous measurements of elastic scattering^{1,2} as well as inelastic measurements of Williams et al.³

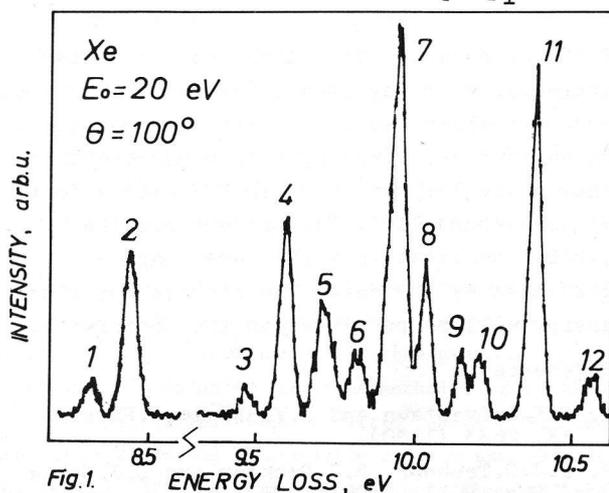


Fig. 1.

Number	Desig.	J	eV	Number	Desig.	J	eV		
1	6s	$[3/2]$	2	8.315	7	6p	$[1/2]$	0	9.934
2	6s	$[3/2]$	1	8.437	5d	$[1/2]$	0	9.891	
3	6s	$[1/2]$	0	9.447	5d	$[1/2]$	1	9.917	
4	6s	$[1/2]$	1	9.570	5d	$[7/2]$	4	9.943	
	6p	$[1/2]$	1	9.580	5d	$[3/2]$	2	9.959	
5	6p	$[5/2]$	2	9.686	8	5d	$[7/2]$	3	10.039
	6p	$[5/2]$	3	9.721	9	5d	$[5/2]$	2	10.158
6	6p	$[3/2]$	1	9.789	10	5d	$[5/2]$	3	10.220
	6p	$[3/2]$	2	9.821	11	5d	$[3/2]$	1	10.401
					12	7s	$[3/2]$	2	10.562
						7s	$[3/2]$	1	10.593

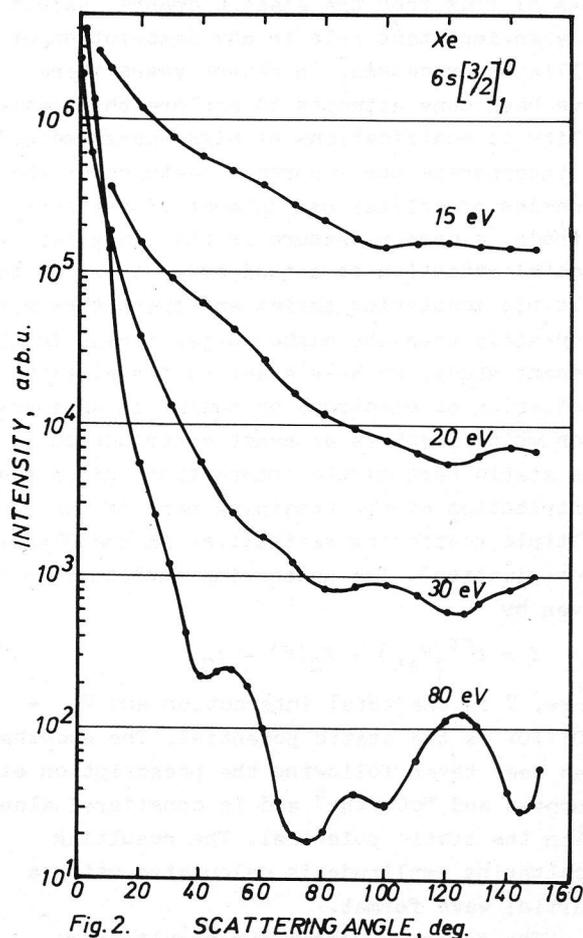


Fig. 2. SCATTERING ANGLE, deg.

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