

PARAMETRIC VARIATIONS IN TOKAPOLE II

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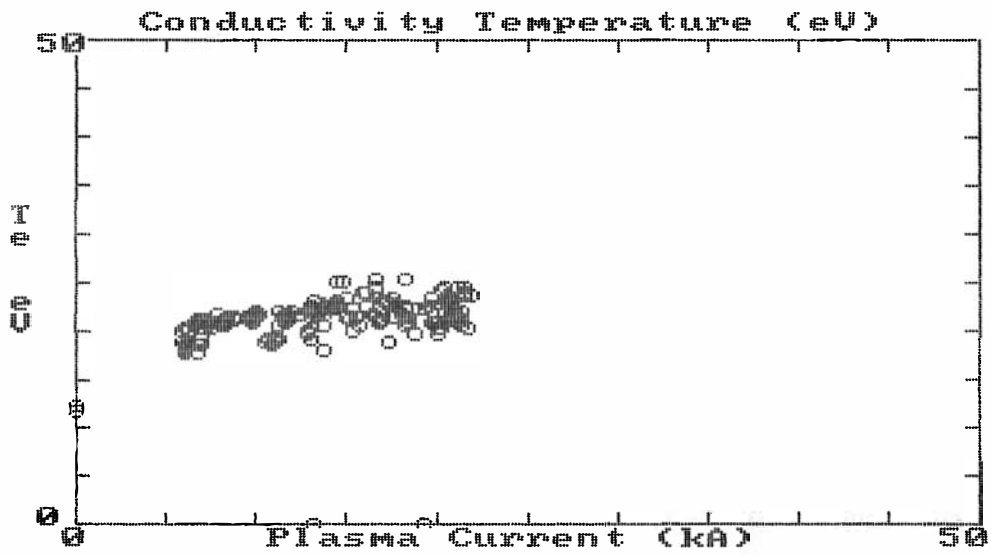
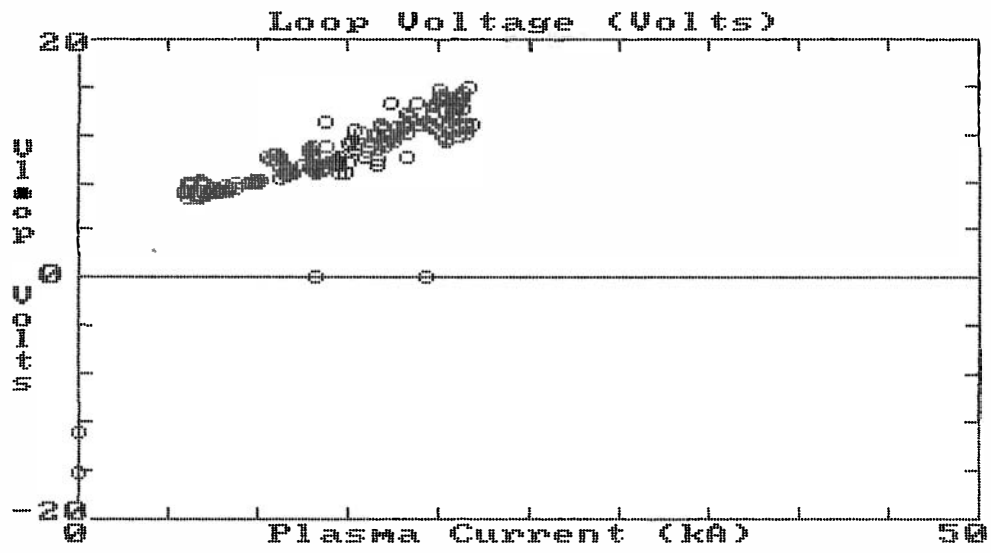
University of Wisconsin

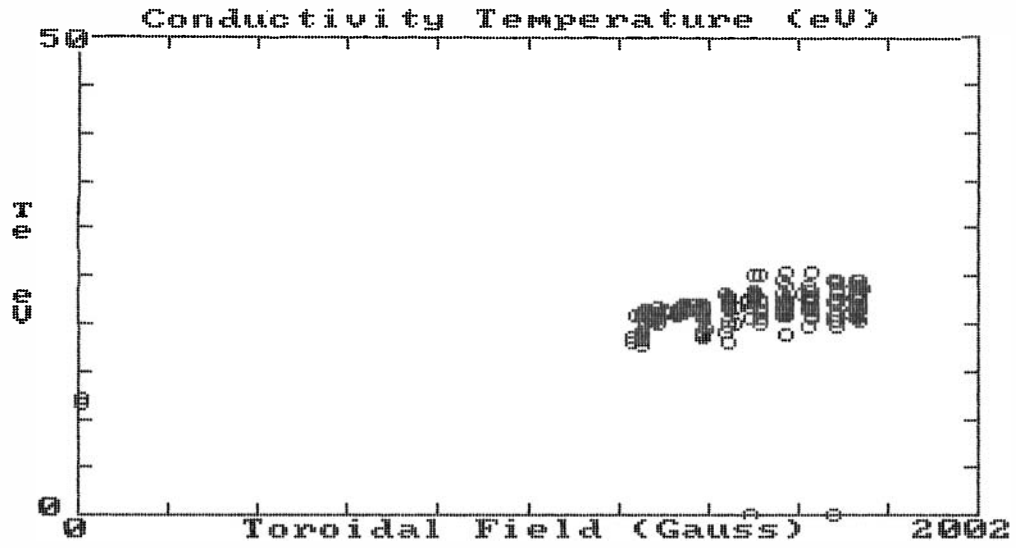
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PARAMETRIC VARIATIONS IN TOKAPOLE II

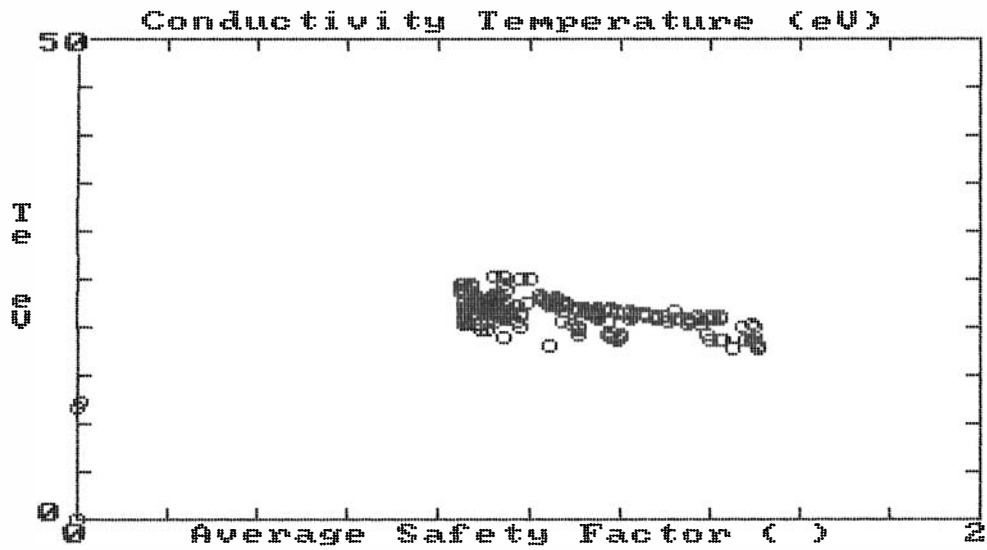
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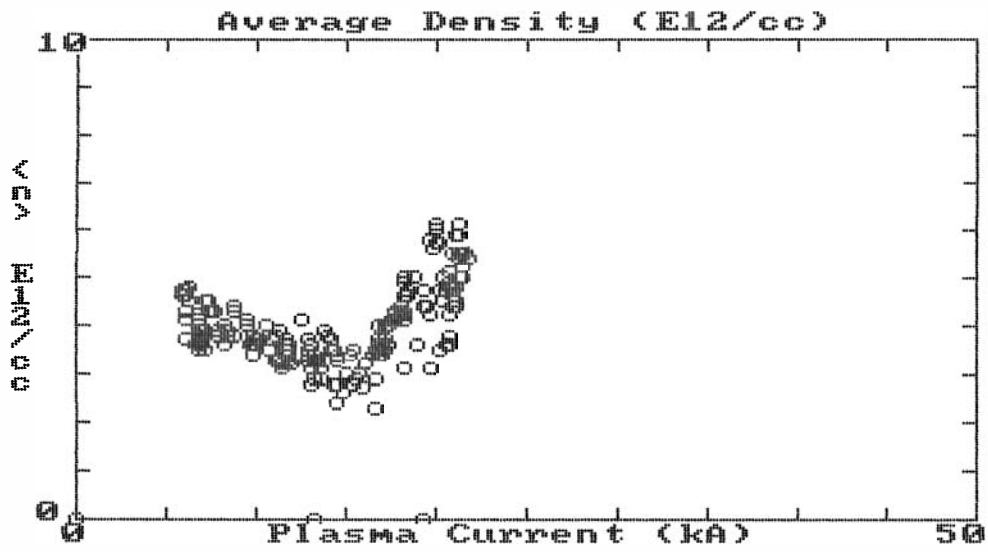
The new IBM-PC monitor system on Tokapole II allows easy measurement of the variation of any quantity versus any other at the time of peak plasma current for the preceeding 200 shots. This capability was exploited to determine the variation of typical quantities such as loop voltage, conductivity temperature, density and confinement time vs other quantities such as plasma current, toroidal field, and safety factor. This was done for 200 pulse-discharge-cleaning shots in which the repetition rate was varied. Five to ten shots at each rep rate were taken in order for the gas puff tracking circuit to optimize the amp-seconds. This is only one of many ways to do such an experiment since the procedure constrains the toroidal field, poloidal gap voltage (at $t = 0$) and hoop current to follow each other linearly. Nevertheless, the results have interesting trends as shown in the attached graphs.



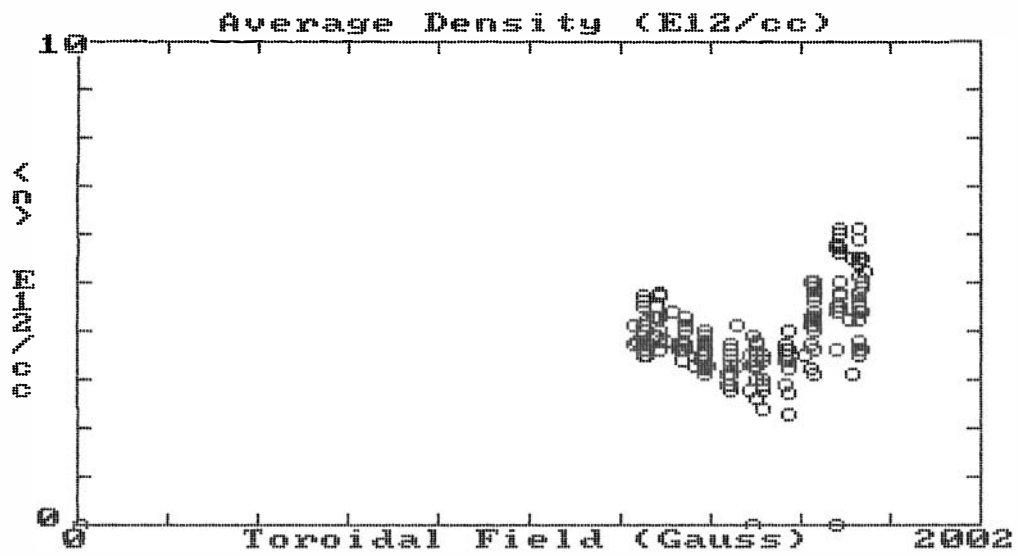


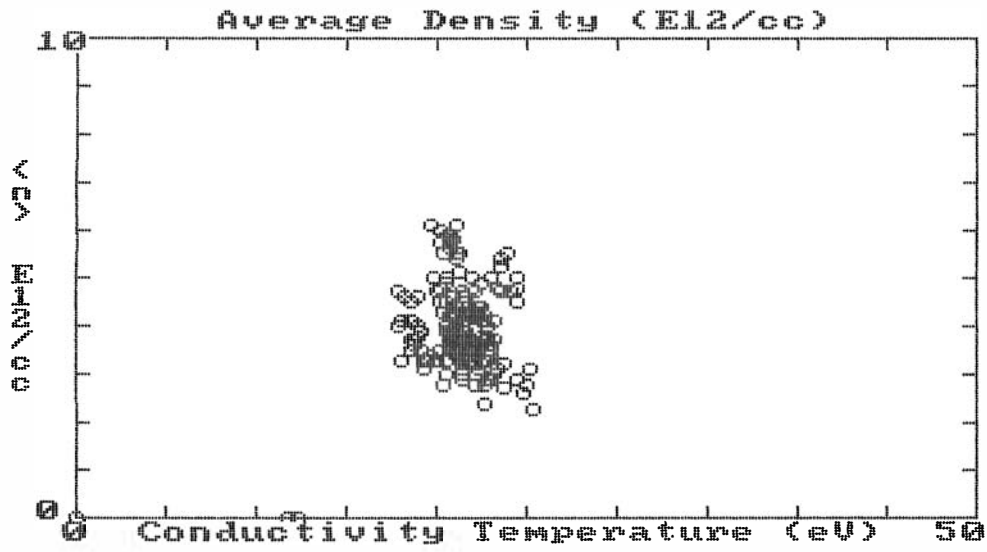
Graph of shot 1714 05-22-1985 14:01:40



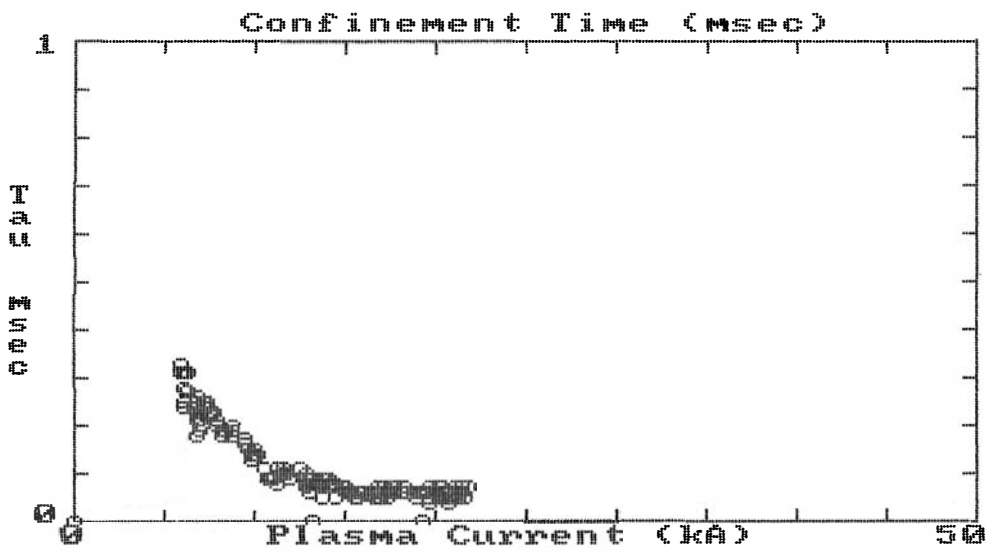


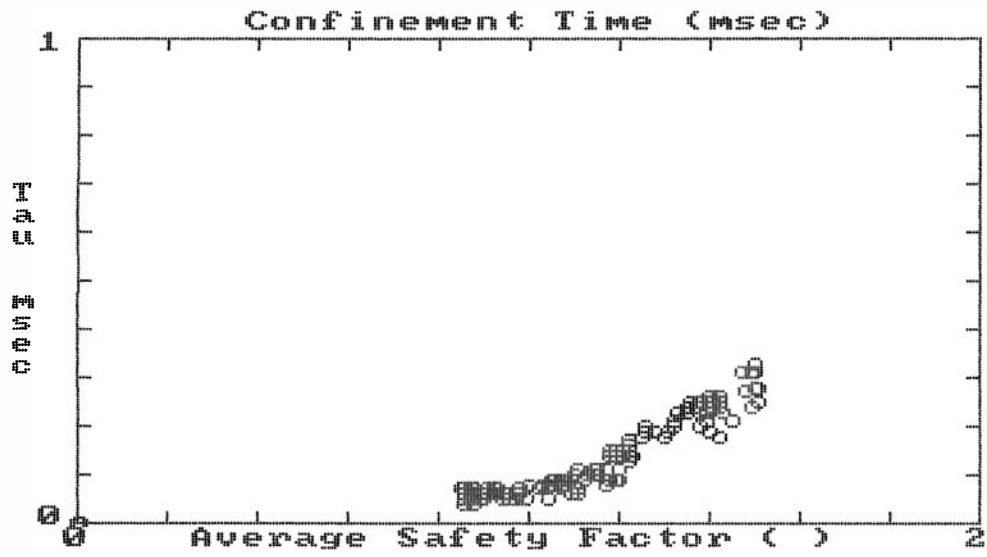
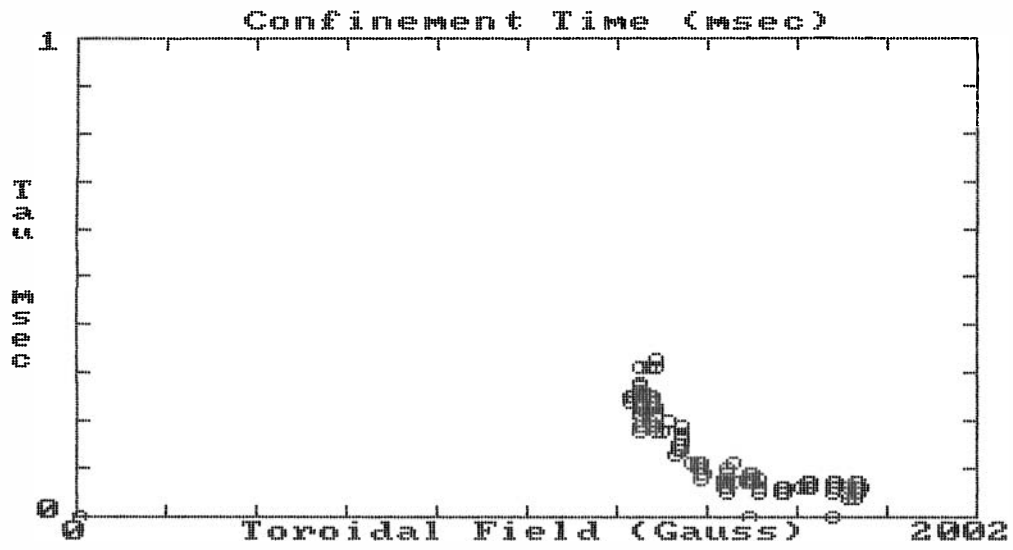
Graph of shot 1714 05-22-1985 14:01:40

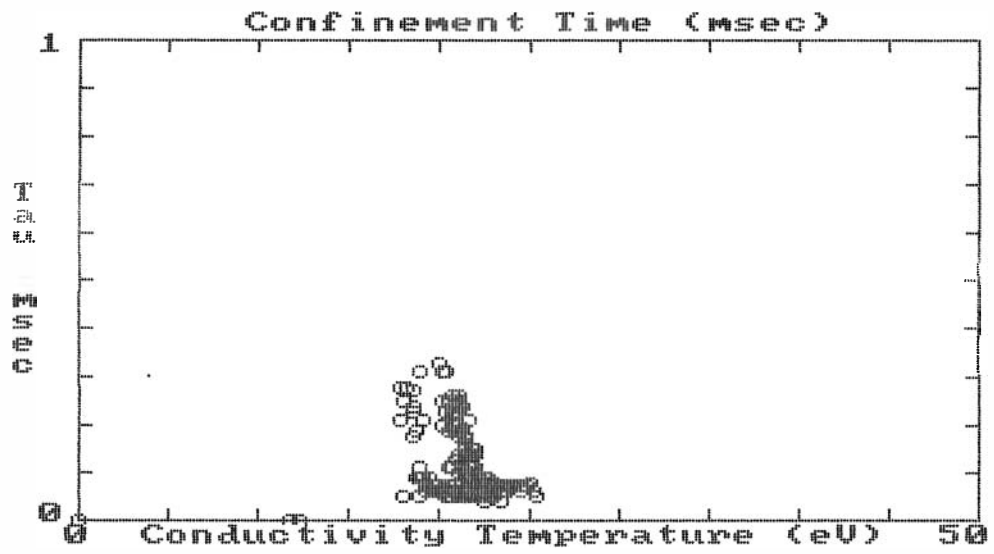




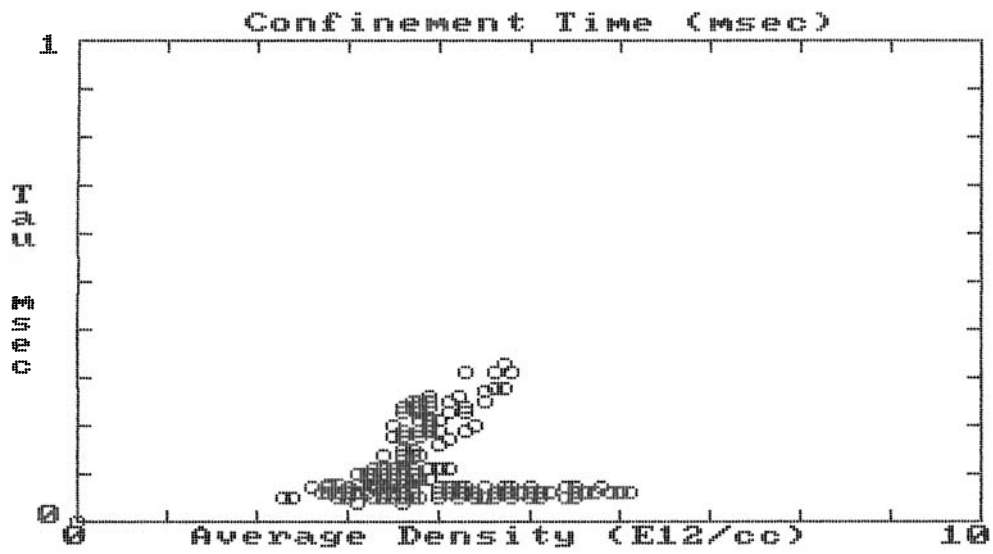
Graph of shot 1714 05-22-1985 14:01:40







Graph of shot 1714 05-22-1985 14:01:40



Shot: 1714 05-22-1985 14:01:40 Ip = 21 kA at 1.5 msec 45 Amp-sec						
Time	Ip	Jsat	Bt	Vpg	Ihoop	
0.3	5	183	1504	35	75	
0.5	13	437	1582	32	103	
0.8	18	344	1650	30	127	
1.0	20	239	1689	27	148	
1.3	20	273	1719	23	166	
1.5	21	261	1748	19	179	
1.8	21	542	1738	15	188	
2.0	19	513	1719	11	193	
2.3	15	378	1680	7	195	
2.5	10	225	1650	3	194	
2.8	5	186	1592	-1	189	
3.0	2	234	1572	-3	183	
3.3	1	198	1533	-3	176	
3.5	0	142	1494	-3	170	
3.8	0	105	1475	-1	165	
4.0	1	81	1445	-0	162	
4.3	0	63	1416	0	159	
4.5	0	56	1387	-0	156	
4.8	0	49	1367	-1	153	
5.0	0	46	1338	-1	149	
msec	kA	mA/cm ²	Gauss	Volts		kA

ADDITIONAL DERIVED DATA FOR SHOT 1714 05-22-1985 14:01:40 45 Amp-sec							
Time	a	<q>	Vloop	Poh	Te	<n>	Tau
0.3	10.8	1.6	-1.2	-12.9	71.3	4.2	-3.4
0.5	11.1	1.2	4.6	77.4	36.3	4.5	0.3
0.8	10.9	1.0	11.0	214.2	22.8	3.4	0.1
1.0	10.6	0.9	11.7	238.1	23.3	3.1	0.0
1.3	10.4	0.9	10.4	220.6	26.6	3.2	0.1
1.5	10.2	0.9	13.0	272.5	23.5	5.2	0.1
1.8	9.8	0.9	16.4	312.8	19.7	6.6	0.1
2.0	9.3	0.9	18.7	288.6	17.1	5.6	0.0
2.3	8.5	1.1	18.6	203.4	15.3	3.9	0.0
2.5	7.4	1.4	15.9	101.3	14.1	2.8	0.1
2.8	6.1	2.1	10.3	29.4	14.3	3.0	0.2
3.0	4.8	3.4	3.8	4.0	19.8	2.7	1.9
3.3	4.1	4.8	0.0	0.0	752.5	5.2	93162.5
3.5	4.0	5.0	-0.8	-0.4	41.5	1.4	-22.3
3.8	4.3	4.5	-0.3	-0.2	90.3	1.2	-95.5
4.0	4.1	4.8	0.9	0.5	37.5	0.8	9.5
4.3	4.1	4.9	0.6	0.3	50.3	0.7	18.7
4.5	4.1	4.9	0.5	0.2	55.8	0.6	21.8
4.8	3.8	5.7	0.2	0.1	79.5	0.6	83.3
5.0	4.1	5.0	-0.4	-0.2	66.6	0.5	-33.3
msec	cm		Volts	kW	eV	E12/cc	msec