

Leakage Current estimate for Run2b

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Theory

$$\Delta I = \alpha [A/cm] \cdot \Phi [cm^{-2}] \cdot V [cm^3]$$

↳ α is called the damage constant

Leakage current scales with T:

$$I(T) = I(T_1) \cdot (T/T_1)^2 \cdot \exp(-E_g(T_1 - T)/(2 \cdot k_B \cdot T T_1))$$

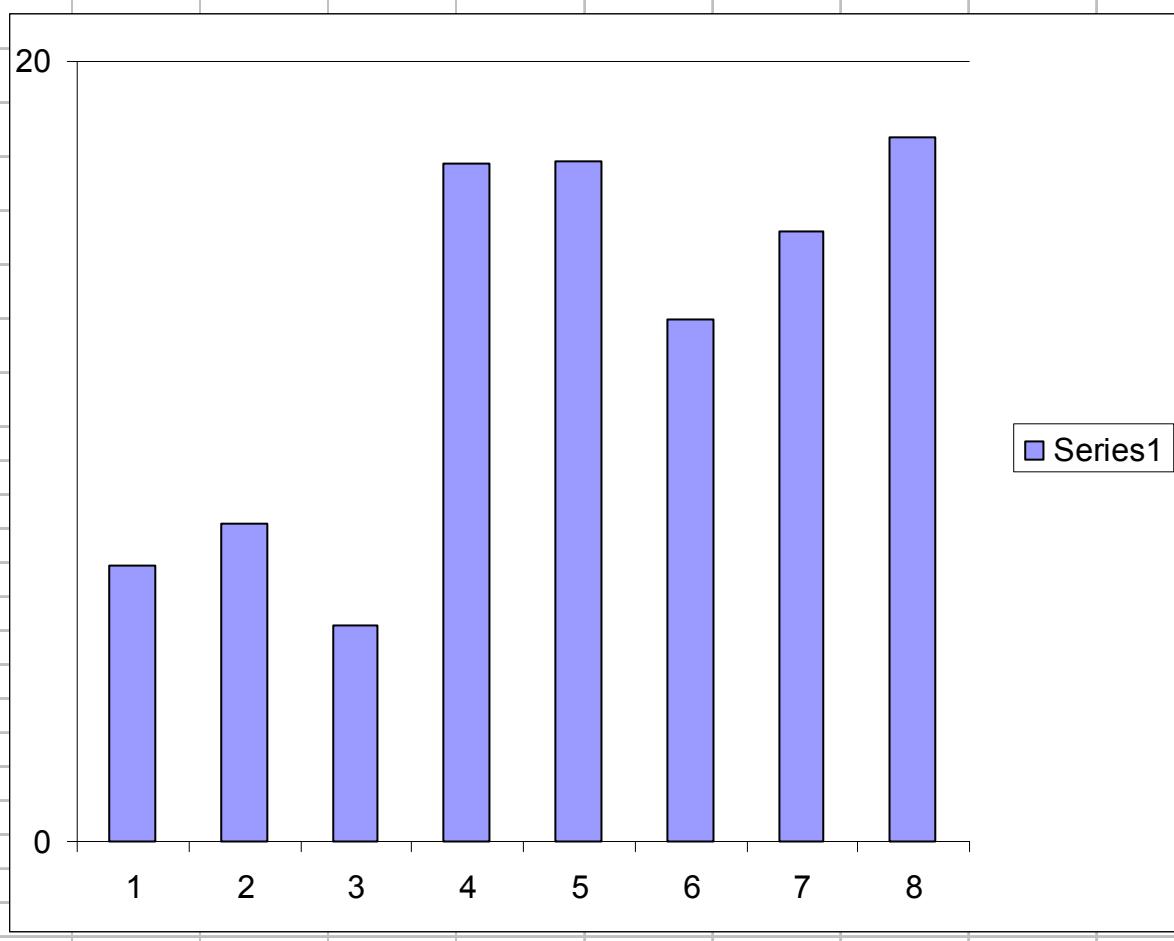
Experiment

No	Detector	5/23/2001	7/5/2001	8/6/2001	Total Doze	Remarks
1	Elma 214	x			5 Mrad	Ox
2	Elma 2-1-2			x	5 Mrad	Glued Be on the corner
3	Elma 2-1-1			x	5 Mrad	Glued Be on the center
4	Elma 6-2		x	x	10 Mrad	Non-Ox
5	Elma 5-1		x	x	10 Mrad	Non-Ox
6	Elma 7-2		x	x	10 Mrad	Non-Ox
7	Micron 4D		x	x	10 Mrad	Ox
8	ST230W2D6		x	x	10 Mrad	
9	Elma 233	x	x	x	15 Mrad	Ox
10	Elma 236	x	x	x	15 Mrad	Ox
11	Elma 253	x	x	x	15 Mrad	Ox
12	Hmm 077	x	x	x	15 Mrad	
13	Hmm 134	x	x	x	15 Mrad	
14	Hmm 144	x	x	x	15 Mrad	
15	Micron 4C	x	x	x	15 Mrad	Ox

Results

Doze=5Mrad	ELMA 214	ELMA 233	ELMA 236	ELMA 253	HMM 134	HMM 144	HMM 77	Micron 4d	Micron 4c		
T=10C											
Vbias											
160 V	0.327 mA	0.433	0.307	0.347	0.587	0.847	0.604		0.408		
180 V	0.353 mA	0.46	0.32	0.367	0.633	0.92	0.657		0.432		
200 V	0.387 mA	0.493	0.34	0.38	0.687	0.98	0.7		0.456		
160 V		0.327	0.287	0.307	0.547	0.604	0.606				
180 V		0.347	0.293	0.327	0.58	0.657	0.647				
200 V		0.36	0.307	0.333	0.653	0.7	0.72				
Doze=5 Mrad	ELMA 214	ELMA 233	ELMA 236	ELMA 253	HMM 134	HMM 144	HMM 77	Micron 4d	Micron 4c	ST230 D6	ELMA 7-2
T=-13C											
Vbias=160 V											
12.73 uA								28.9 uA		41.26 uA	68.2 uA
170	12.86	33	29	32	56	62	63	29.2		41.3	69
200	13.31	34.42	29.35	31.84	62.43	66.92	68.83	30.12		42.19	71.27
Doze =10 Mrad	ELMA 214	ELMA 233	ELMA 236	ELMA 253	HMM 134	HMM 144	HMM 77	Micron 4d	Micron 4c	ST230 D6	ELMA 7-2
T=-13											
Vbias=160V											
31.19		37.84		36.21	63.3	54.6	71.13		51.26		
170	35.5	36.6		36.6	64.6	55.7	72.11	53.7	52	57.6	151
Doze=15 Mrad	ELMA 214	ELMA 233	ELMA 236	ELMA 253	HMM 134	HMM 144	HMM 77	Micron 4d	Micron 4c	ST230 D6	
T=-13											
Vbias=170V											
		23.7	27.2	18.5	86.7	87	66.89		78.2		

Results



$$I_{\text{leak}}/\text{strip} = p * t * I^* \alpha * \phi * (t_1/t_0)^{**2} * \exp(-E^*(t_1-t_0)/2/k/t_1/t_0)$$