

Irradiation test with fast neutrons at LNL on 16/06/99
Estimated mean neutron flux is $\Phi=4 \times 10^6$ n/cm²/μC

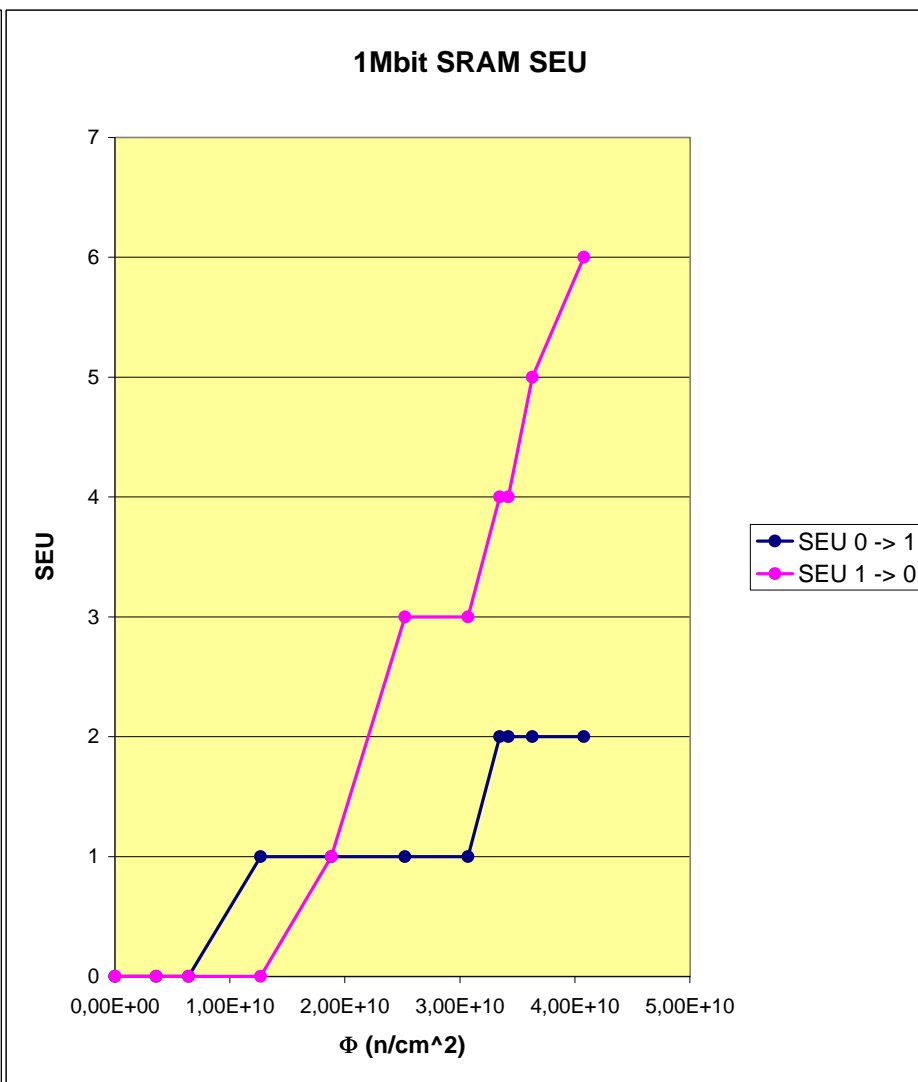
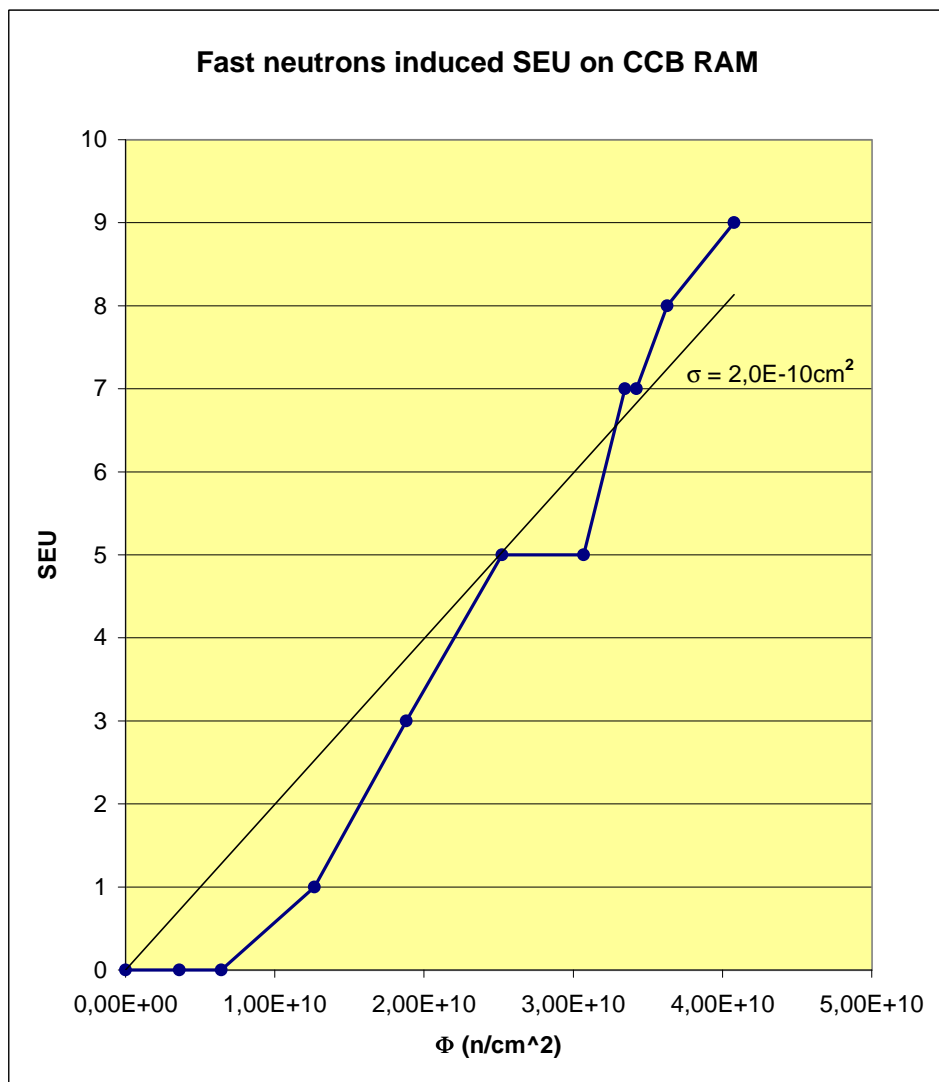
DAY	BEAM	NOTES	TIME	Δt (hh.mm)	t (s)	CHARGE (C)	Φ (n/cm ²)	SEU
16/06/99	400nA	Chip TO su targhetta tolto chip TO da targhetta	10.23	0.00	0	0,00E+00	0,00E+00	0
			10.54	0.31	1860	9,01E-04	3,60E+09	0
			11.23	0.29	3600	1,60E-03	6,42E+09	0
			12.23	1.00	7200	3,17E-03	1,27E+10	1
			13.23	1.00	10800	4,71E-03	1,88E+10	3
			14.32	1.09	14940	6,30E-03	2,52E+10	5
			15.27	0.55	18240	7,68E-03	3,07E+10	5
			16.02	0.35	20340	8,37E-03	3,35E+10	7
			16.21	0.19	21480	8,56E-03	3,42E+10	7
			16.46	0.25	22980	9,07E-03	3,63E+10	8
			17.30	0.44	25620	1,02E-02	4,08E+10	9

SRAM SEUs distinguishing 0-to-1 from 1-to-0 upsets.

1Mbit SRAM type SONY CXK581000AM-70LL (SN. 445J93E S) package SOIC-32

DAY	BEAM	NOTES	TIME	Δt (hh.mm)	t (s)	CHARGE (C)	Φ (n/cm ²)	SEU 0 -> 1	SEU 1 -> 0
16/06/99	400nA	Chip TO su targhetta tolto chip TO da targhetta	10.23	0.00	0	0,00E+00	0,00E+00	0	0
			10.54	0.31	1860	9,01E-04	3,60E+09	0	0
			11.23	0.29	3600	1,60E-03	6,42E+09	0	0
			12.23	1.00	7200	3,17E-03	1,27E+10	1	0
			13.23	1.00	10800	4,71E-03	1,88E+10	1	1
			14.32	1.09	14940	6,30E-03	2,52E+10	1	3
			15.27	0.55	18240	7,68E-03	3,07E+10	1	3
			16.02	0.35	20340	8,37E-03	3,35E+10	2	4
			16.21	0.19	21480	8,56E-03	3,42E+10	2	4
			16.46	0.25	22980	9,07E-03	3,63E+10	2	5
			17.30	0.44	25620	1,02E-02	4,08E+10	2	6

BEAM *Deuterium nominal beam current*
 TIME *Day time of CHARGE measurement*
 Δt *Differential day time*
 t *Irradiation time*
 CHARGE *Beam current integrated on target*
 Φ *Estimated neutron flux on DUT*
 SEU *Total number of SEU*



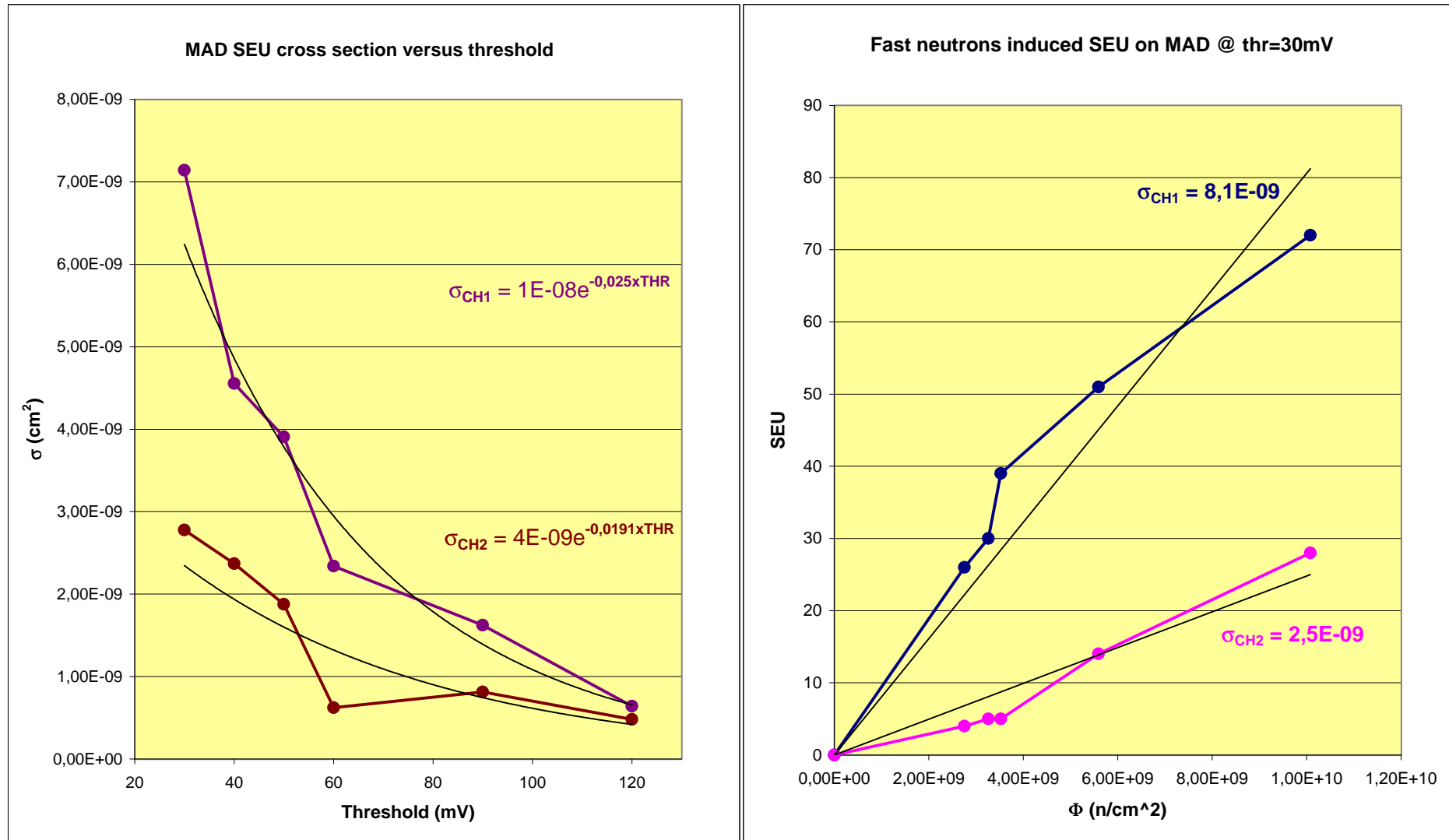
σ SRAM SEU cross section
 Neutron flux is calculated using the nominal yield of $4 \times 10^6 \text{ n/cm}^2/\text{mC}$

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DAY	BEAM	Threshold (mV)	CHARGE (C)	Φ (n/cm ²)	MAD Ch1	MAD Ch2	σ Ch1 (cm ²)	σ Ch2 (cm ²)
16/06/99	400nA	30	2,52E-03	1,01E+10	72	28	7,14E-09	2,78E-09
		40	1,37E-03	5,49E+09	25	13	4,56E-09	2,37E-09
		50	1,60E-03	6,40E+09	25	12	3,91E-09	1,88E-09
		60	1,60E-03	6,42E+09	15	4	2,34E-09	6,23E-10
		90	1,54E-03	6,16E+09	10	5	1,62E-09	8,12E-10
		120	1,56E-03	6,25E+09	4	3	6,40E-10	4,80E-10

DAY	BEAM	NOTES	TIME	Δt (hh.mm)	t (s)	CHARGE (C)	Φ (n/cm ²)	MAD Ch1	MAD Ch2
16/06/99	400nA	Threshold 30mV	15.27	0.00	0	0,00E+00	0,00E+00	0	0
			16.02	0.35	2100	6,89E-04	2,76E+09	26	4
			16.17	0.15	3000	8,16E-04	3,26E+09	30	5
		tolto chip TO da targhetta	16.21	0.04	3240	8,81E-04	3,52E+09	39	5
			16.46	0.25	4740	1,40E-03	5,59E+09	51	14
			17.30	0.44	7380	2,52E-03	1,01E+10	72	28

BEAM *Deuterium nominal beam current*
 THRESHOLD *MAD chip threshold*
 CHARGE *Beam current integrated on target*
 Φ *Estimated neutron flux on DUT*
 MAD *MAD board channels SEU*
 σ *MAD board channels cross section*
 TIME *Day time of CHARGE measurement*
 Δt *Differential day time*
 t *Irradiation time*



Neutron flux is calculated using the nominal yield of $4 \times 10^6 \text{ n/cm}^2/\text{mC}$