IDS80 WITH IRON PLUG: DETAILS OF THE 4 MW ENERGY DISTRIBUTION IN THE TARGET STATION

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Energy deposition from MARS+MCNP codes.

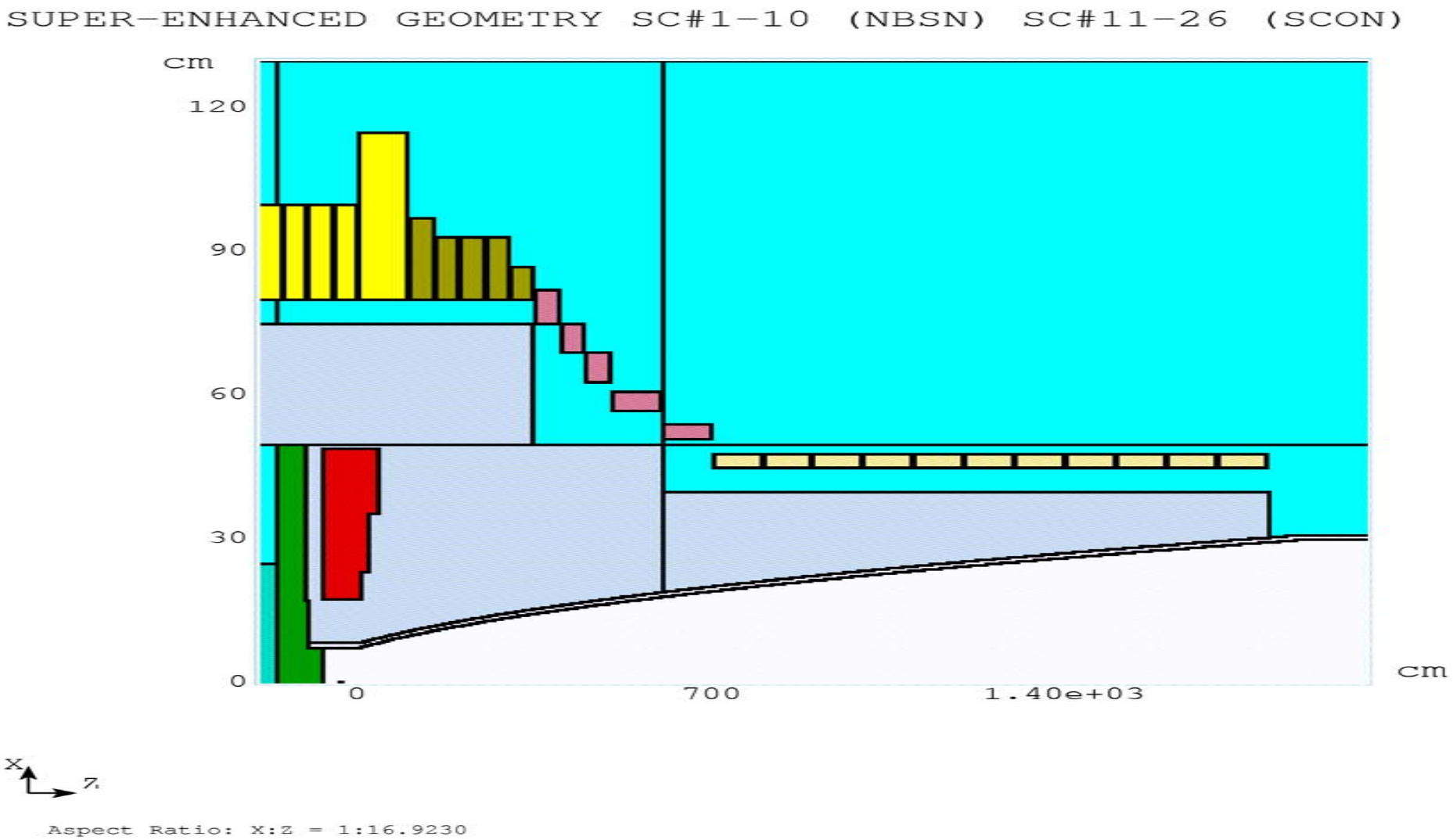
IDS80 GEOMETRY WITH IRON PLUG,
STANDARD SHIELDING (60%WC+40% H2O)

GAUSSIAN PROFILE: $\sigma_x=\sigma_y=0.12$ cm

E=8 GeV, 4MW proton beam

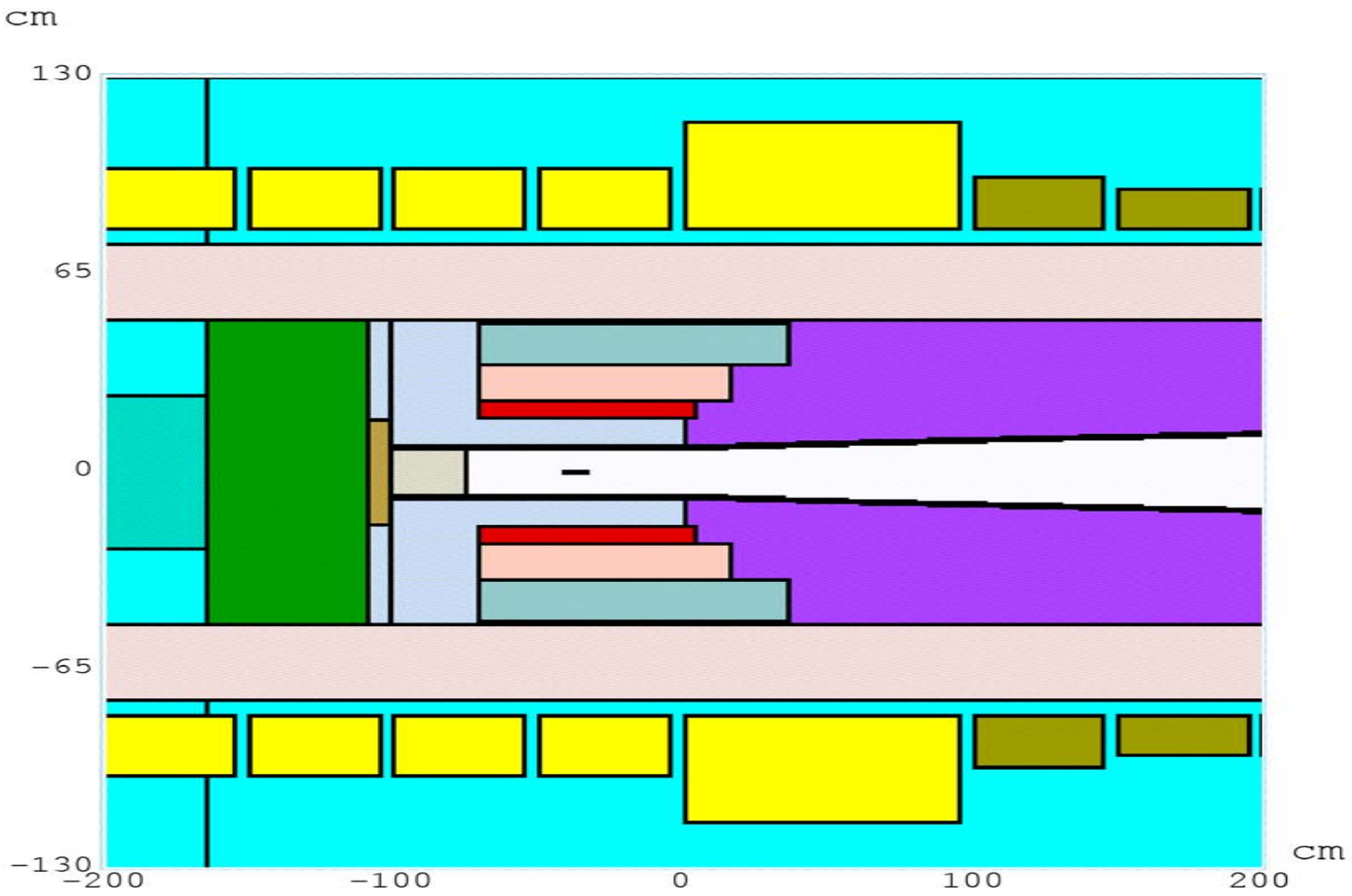
10^{-11} MeV MINIMUM NEUTRON ENERGY

IDS80 SOLENOID GEOMETRY, SC#1-10 (NiSn+..), SC#11-26(NiTi+..)

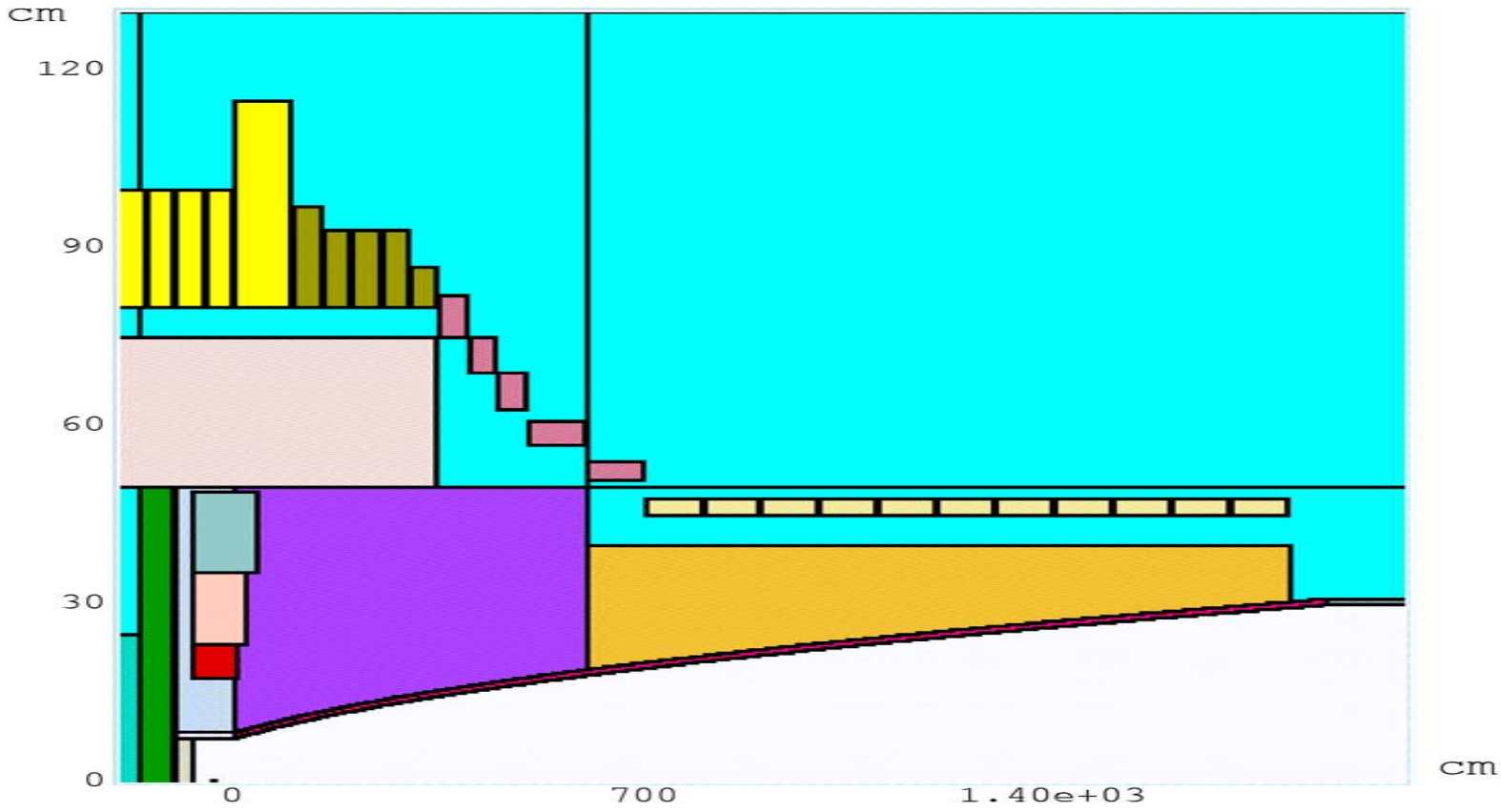


NEW: SC#1-10 -200<z<345 cm R_{in}=80.0 cm R_{out}=100 (1-4)/115 (5)/97 (6)/93(7-9)/87(10)cm
SC#11-15 350<z<695 cm R_{in}=75.0-->51 cm R_{out}=82.0-->54 cm
SC#16-26 700<z<1795 cm R_{in}=45 cm R_{out}=48 cm (TOTAL # SC=26)

DETAILED GEOMETRY PLOT 1



DETAILED GEOMETRY PLOT 2



Aspect Ratio: X:Z = 1:16.9230

ENERGY DEPOSITED IN SC SOLENOIDS (SC#), SHIELDING (SH#).

NiSn/NiTi	P(kW)	60/40	P(kW)
SC#1-5	2.42	SH#1	967.5
SC#6-10	0.57	SH#2	1107.5
SC#11-15	0.16	SH#3	36.04
SC#16-26	0.31	SH#4	31.83
SC#1-26	3.64	SH#1-4	2142.87

ENERGY DEPOSITED IN RESISTIVE COILS (RS#), BEAM PIPE (BP#), IRON PLUG (IP#).

(Cu)	P(kW)	(STST)	P(kW)	(FeCo)	P(kW)
RS#1	68.25	BP#1	207.50	IP#1	0.24
RS#2	66.05	BP#2	238.40	IP#2	0.11
RS#3	36.50	BP#3	8.02	IP#3	11.35
RS#1-3	170.80	BP#1-3	453.92	IP#1-3	11.70

ENERGY DEPOSITED IN OTHER PARTS AND TOTALS .

TOTALS	P(kW)
SC#1-26	3.64
SH#1-4	2142.87
RS#1-3	170.80
BP#1-3	453.92
IP#1-3	11.70
Hg TARG.	379.90
Hg POOL	9.32
Be WIND.	6.16
TOTAL	3178.31

ABOUT 80% OF THE 4 MW IS ACCOUNTED FOR. WHERE IS THE REST?
DOES THE ENERGY LOST FROM THE PARTICLES ADD UP TO
THE ENERGY DEPOSITED TO THE TAGRET STATION FROM 0-18 m.

KINETIC ENERGY LOST FROM THE PARTICLES FROM 0 TO 18 AND TO 50 m VS. THE ENERGY DEPOSITED IN PARTS OF THE TARGET STATION.

KINETIC ENERGY AT z=0 m:

T_p=1008.013 kW, T_n=195.443 kW, T_pi(+/-)=171.088 kW
T_K(+/-)=5.879 kW, T_muons(+/-)=8.226 kW, T_e(+/-)=22.513 kW
T_total=1411.162 kW

KINETIC ENERGY AT z=18 m:

T_p=73.895 kW, T_n=3.549 kW, T_pi(+/-)=38.968 kW
T_K(+/-)= 0.303 kW, T_muons(+/-)=16.122 kW, T_e(+/-)=20.829 kW
T_total=153.666 kW ----> diff=1257.496 kW

KINETIC ENERGY AT z=50 m:

T_p=52.516 kW, T_n=0.478 kW, T_pi(+/-)=23.202 kW
T_K(+/-)= 0.045 kW, T_muons(+/-)=24.913 kW, T_e(+/-)=20.933 kW
T_total=122.88 kW---->diff=1288.282 kW

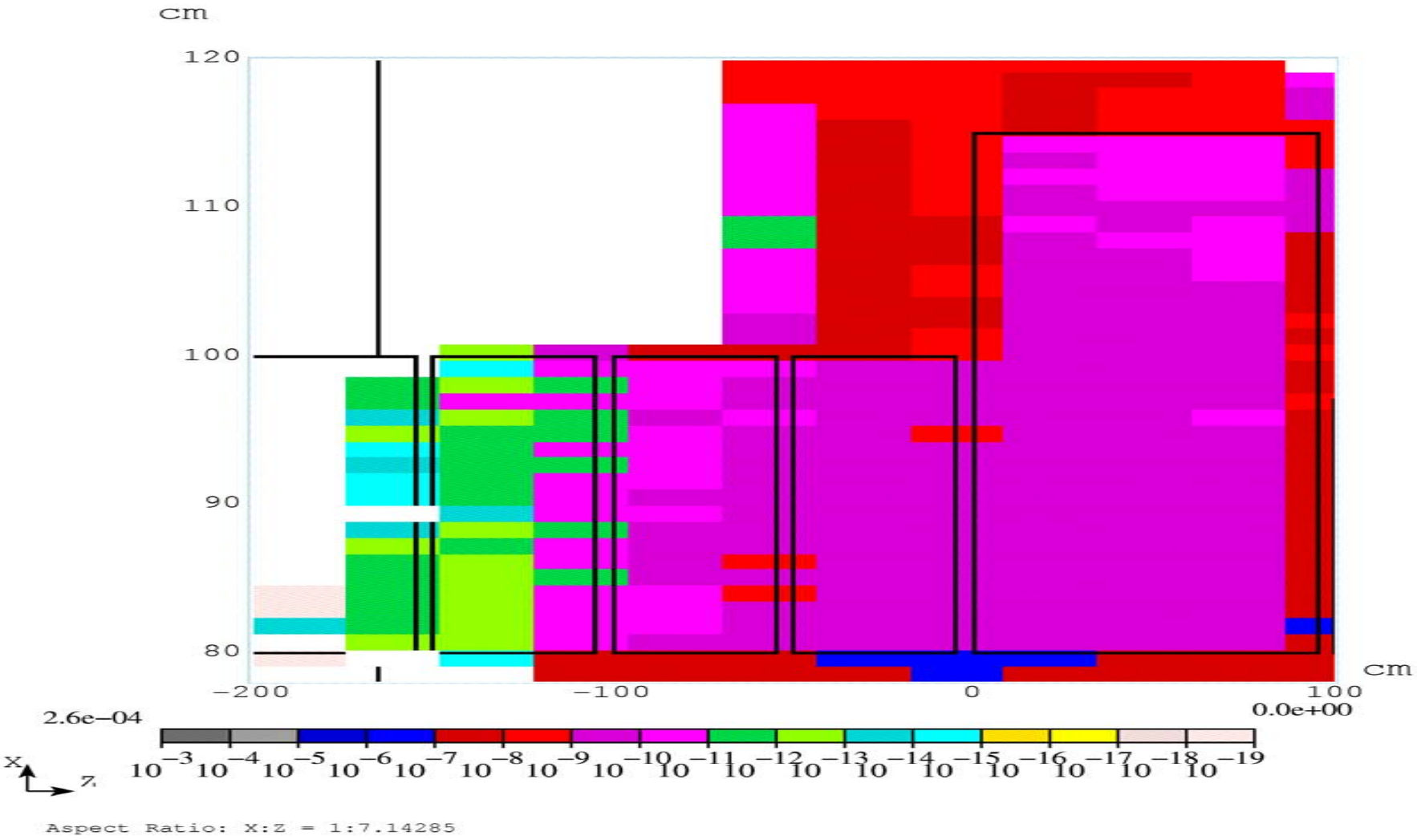
ENERGY DEPOSITED IN: SH#2-3~:1143.54 kW, SH#4~32/2=16 kW
SH_tot~1160 kW
SC#6-26< 1 kW
BP#2-3~246. 4 kW

TOTAL~ 1406 kW DEPOSITED vs. 1257 kW KINETIC ENERGY LOST(PIONS, KAONS, MUONS DOUBLE COUNTING TO A CERTAIN DEGREE HAS TO BE CONSIDERED)

149 kW COME FROM WHERE?

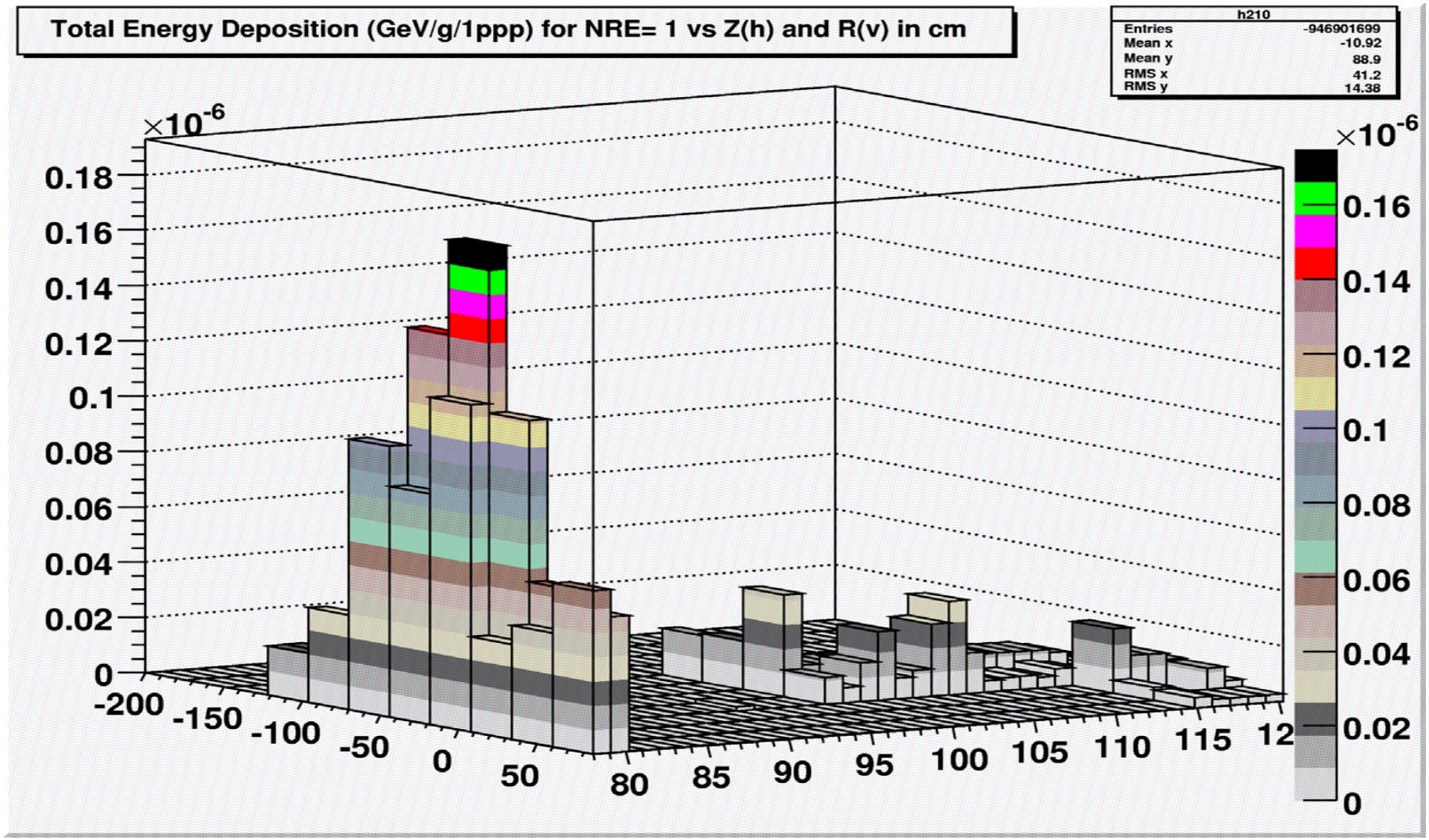
(YES! WE CREATED ENERGY OUT OF NOTHING!)

2D ENERGY DEPOSITED HISTOGRAM FOR FIRST 5 SUPERCODUCTING COILS FOR ESTIMATION OF PEAK VALUE USING MARS GUI.



ENERGY DEPOSITED PEAK VALUE 50 mW/gr AT AREAS IN SC#4,5.

3D ENERGY DEPOSITED HISTOGRAM FOR FIRST 5 SUPERCODUCTING COILS FOR ESTIAMTION OF PEAK VALUE USING ROOT.



PEAK VALUE IN SC#4,5 IS ~87.5 mW/gr AT z~-20 to 10 cm and r~ 80 cm .