IDS120h: Be WINDOW DETAILED CALCULATION, SHIELDING VESSELS, RESULTS FOR DIFFERENT GLOBAL STEPS

Nicholas Souchlas (9/20/2011)

IDS120h:detailed calculation of TDP for Be window, studies with different STEPEM, STEPH global steps, and introducing shielding vessels.

>mars1510/MCNP

>10^{-11} MeV NEUTRON ENERGY CUTOFF

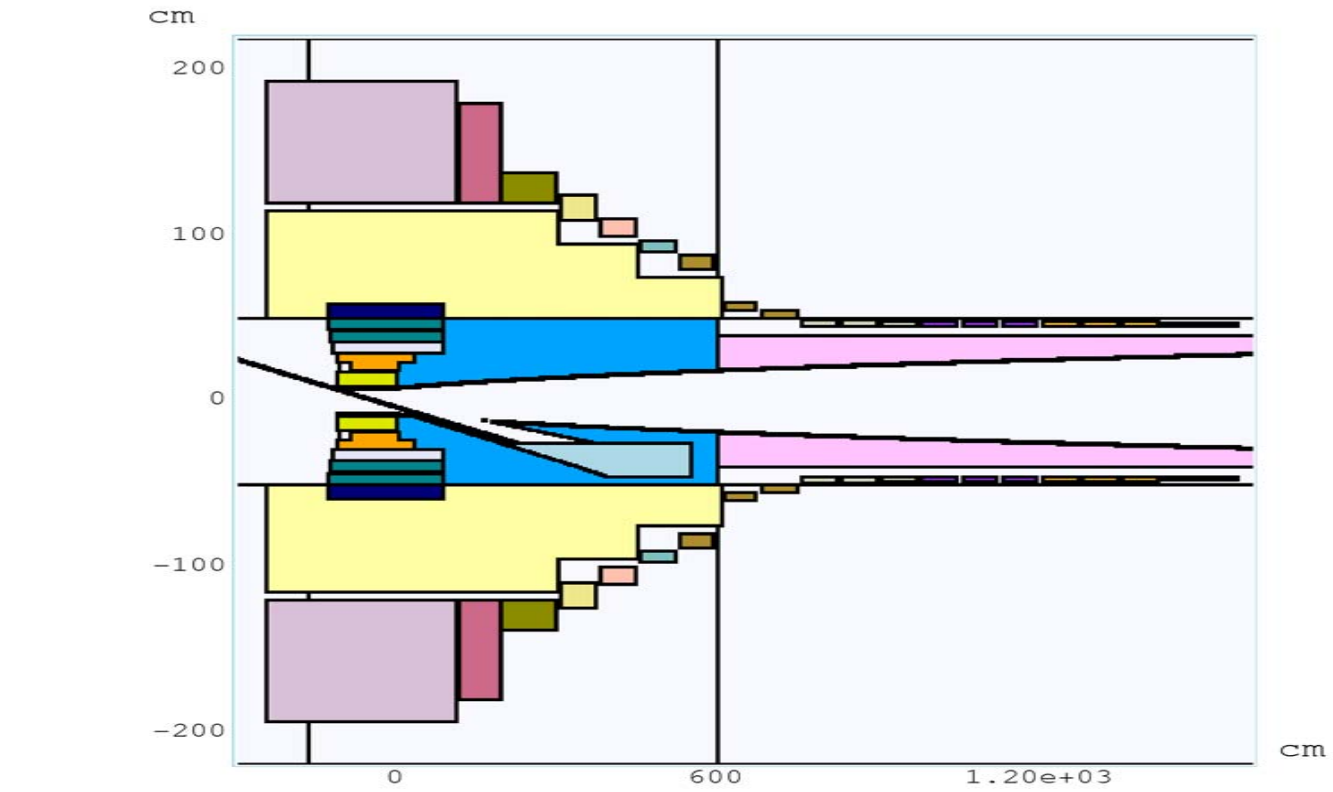
>SHIELDING: 60%WC+40%H_2O

>4 MW proton beam, Np=100,000

>PROTONS ENERGY E=8 GeV.

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

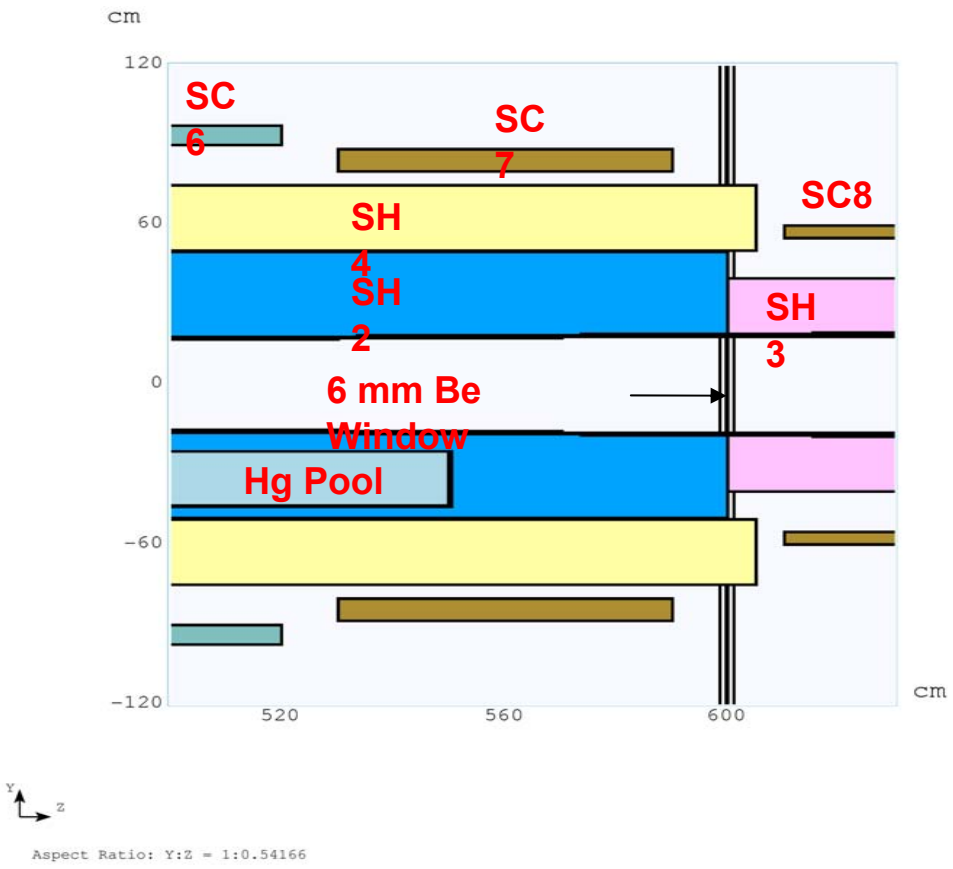
IDS120h geometry.



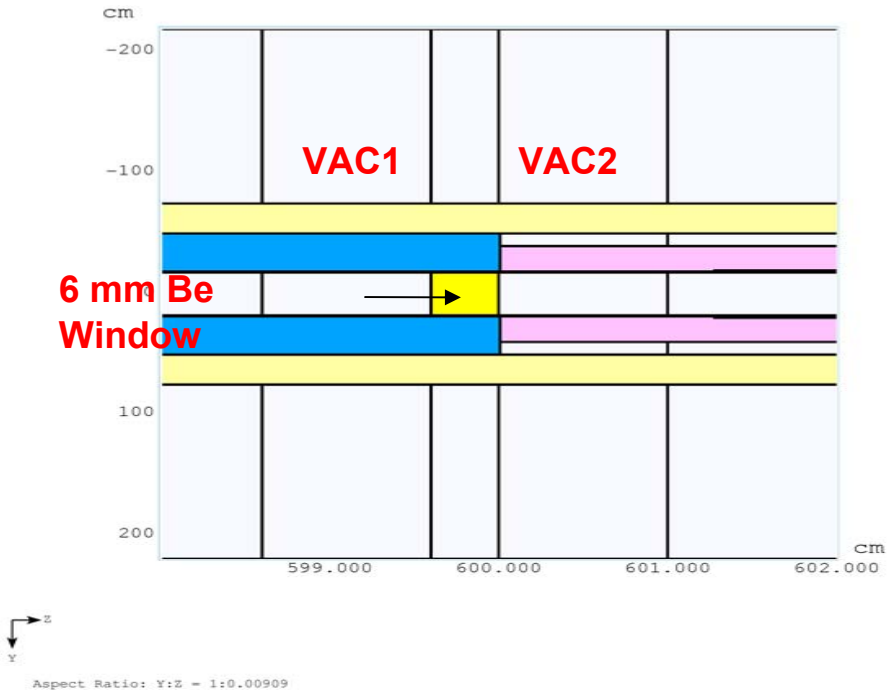
SC#1 NOW THE BIGGEST COIL EXTENDED FURTER UPSTREAM

RS FURTER AWAY FROM Hg POOL GAP, JET AND PROTON BEAM

SH=SHIELDING AREAS
SC=SUPER CONDUCTING COIL



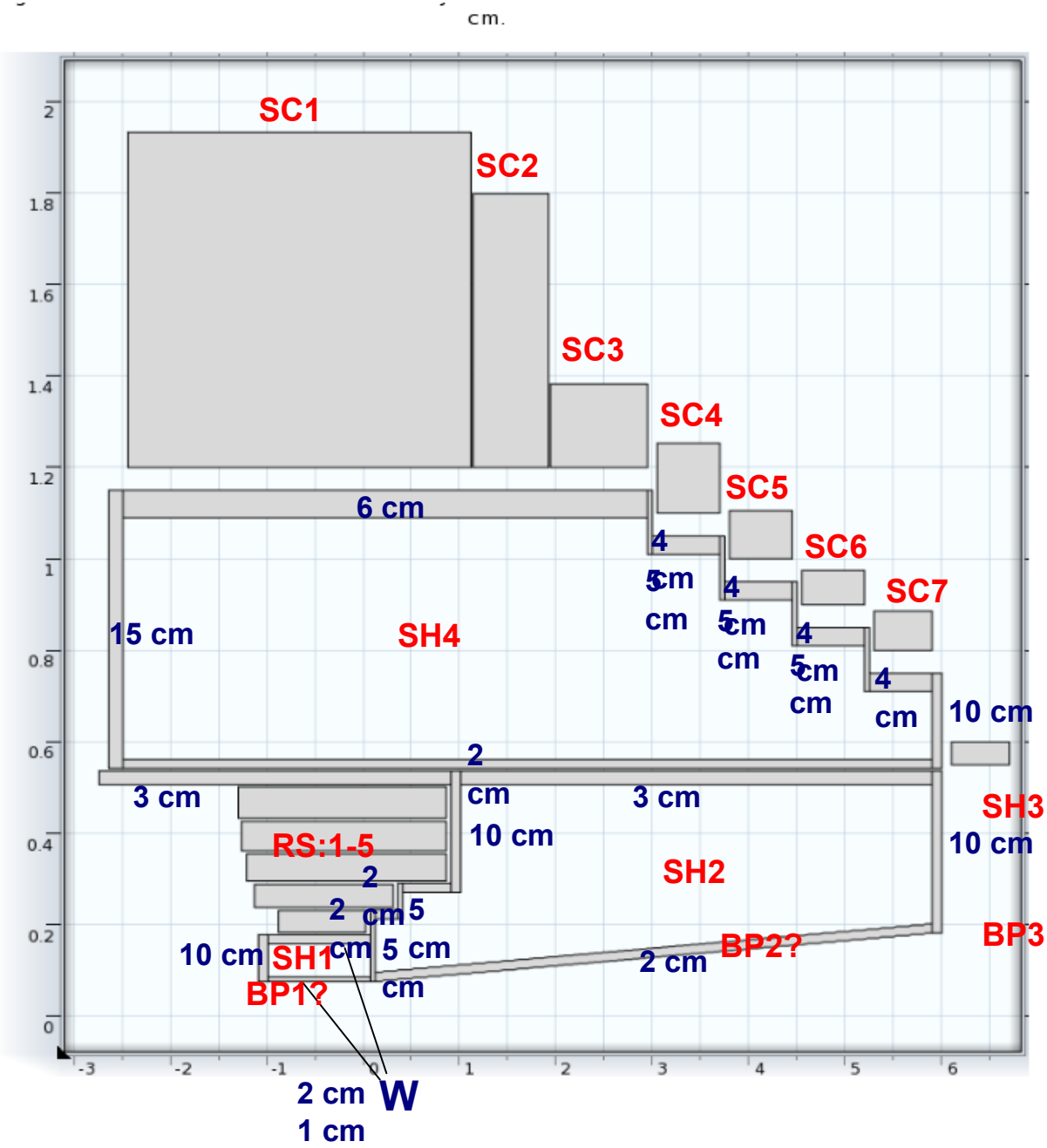
Be Window detail:
1 cm vacuum regions before and after the window (VAC1, VAC2) used for detail studies of the TDP in Be Window.



SAME LOCAL STEPS USED IN ALL THREE REGIONS AND ON THE Be/VAC INTERFACES:
FOR LOCAL MTSM=0.001 cm MTSH=0.001 cm TDP=3.82 kW
BEFORE
FOR GLOBAL STEPEM=0.01 cm STEPH=3.0 cm TDP=0.86 kW
FLUCKA TDP=2.1 kW (P6 UN-OPTIMIZED POINT, OLD POOL GEOMETRY,IDS120f)

Bob Weggel(7/26/11)

IDS120h:SHIELDING VESSELS.



RESULTS FOR 0.5 cm THIKNESS VESSELS KEEPING BP

SC1: 0.645 kW
SC2: 0.01 kW
SC3: 0.016 kW
SC TOT: 0.823 kW
Peak SC1: 0.04 mW/g
SC3: 0.013 mW/g
BP2(1 cm)~191 kW

DETAILS TO BE ADDED...

#WHAT IS THE DISTANCE BETWEEN VESSELS WALLS AND RS?
#THE SH3 VESSEL HAS 2 cm WALLS?
#BP IS NOW PART OF SHIELDING VESSELS SH1, SH2, SH3 WITH THE GIVEN THIKNESS?
#IF NOT, IS THERE SOME SPACE BETWEEN BP AND VESSELS WALLS?

STUDIES WITH DIFFERENT STEPS STEPEM, STEPH

STEPEM=FOR THE ACCURACY OF LOCALIZATION OF BOUNDARIES FOR THE PARTICLE TRANSPORT CODE=0.01 cm (DEFAULT)
STEPH=GLOBAL PILOT STEP LENGTH FOR PARTICLES TRACKING=3.0 cm

SC=SUPER COND. COILS, RS=RESISTIVE COILS, SH=SHIELDING, BP=BEAM PIPE
+/-=MORE/LESS THAN THE STANDARD CASE.

1. STEPEM=0.001 cm, STEPH=3.0 cm---->SC~+0.08 kW
---->RS, BP, HgTarg, HgPool.~SAME±2-4 kW, BeWind.~SAME
---->SH~-7.5 kW,
---->SH1 Peak~-0.022 mW/g

2. STEPEM=0.1 cm, STEPH=3.0 cm ---->SC~-0.07 kW
---->RS, BP, HgTarg, HgPool~SAME±2-4 kW
---->SH~-6.6 kW, BeWind.~+0.5 kW
---->SH1 Peak~-0.023 mW/g

3. STEPEM=0.01 cm, STEPH=1.0 cm ---->SC~-0.07 kW
---->RS, HgTarg, HgPool~SAME±2-4 kW
---->SH~-15 kW, BeWind.~+0.5 kW, BP~+15.5 kW
---->SH1 Peak~-0.01 mW/g

4. STEPEM=0.01 cm, STEPH=5.0 cm ---->SC~-0.05 kW
---->BP, HgTarg, HgPool~SAME±2-4 kW, BeWind.~SAME
---->SH~-28 kW, RS~+24.0 kW
---->SH1 Peak~-0.02 mW/g