20to2T5m WITH RESISTIVE MAGNETS: C TARGET
C TARGET STATION BASELINE + BP#1 SEGMENTATION SET UP

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20to2T5m WITH RESISTIVE MAGNETS: WITH 20 cm GAPS BETWEEN CRYOSTATS

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BASELINE GEOMETRY + BP#1, BP#2 SET UP [ICEM = 1 MODE SIMULATIONS TBP].

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➡ SIMULATIONS CODE: mars15 (2014) [USING MCNPDATA x-SECTION LIBRARIES FOR NEUTRON INTERACTIONS WITH KE < 14 MeV]

➡ NEUTRON ENERGY CUTOFF: 10^{-12} GeV

➡ SHIELDING: 60% W + 40% He [WITH STST VESSELS]

➡ B_z (r = 0, z) : 20 T [z = 0.0 cm] ---→ 2.0 T [z ~ 500.0 cm]

➡ C ROD RADIUS / ANGLE: 0.58 cm / 59 mrads (~ 3.38 degrees) [-37.5 < z < 37.5 cm]

➡ PROTON BEAM POWER: 4.0 MW

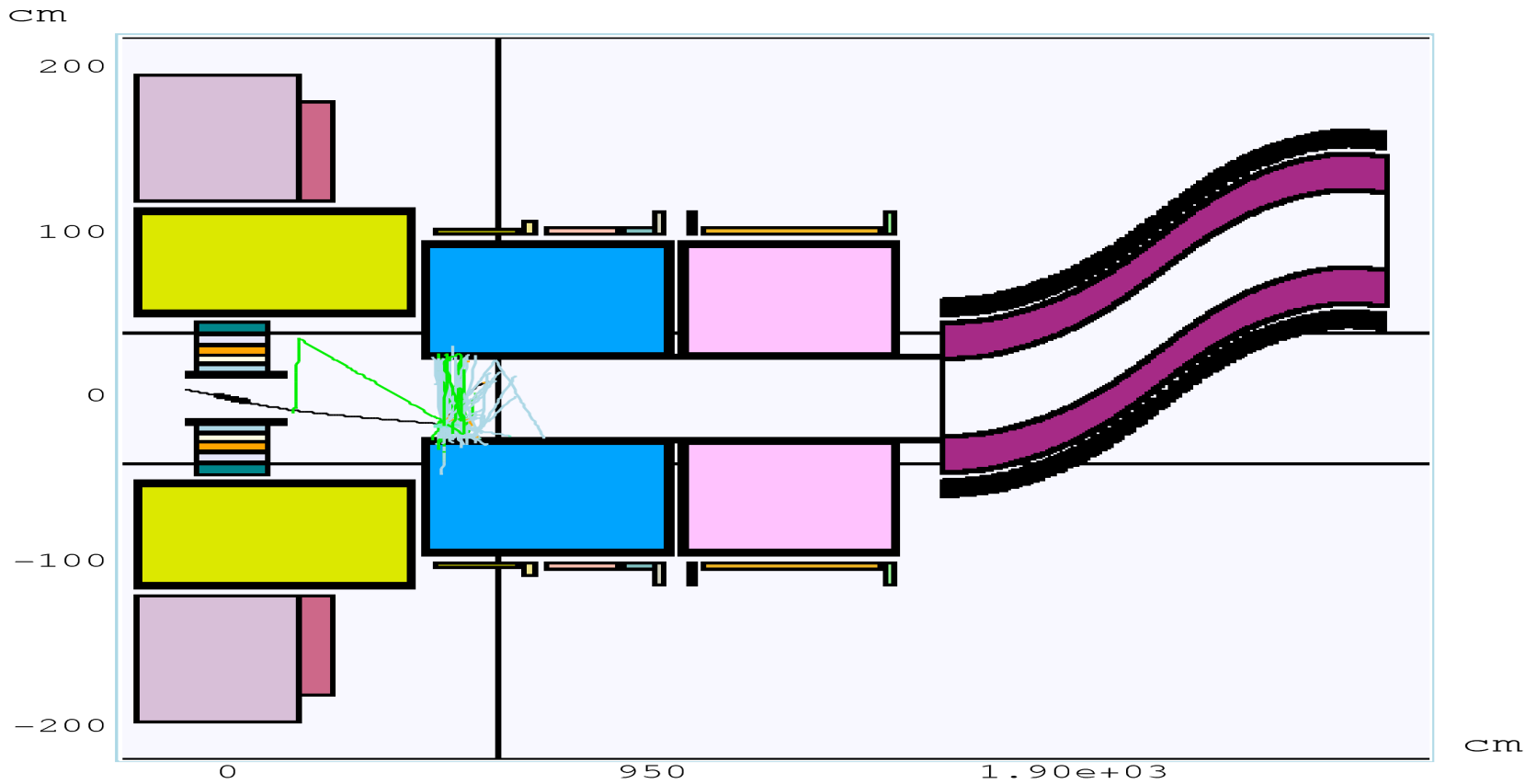
➡ PROTON ENERGY: E = 6.75 GeV

➡ PROTON BEAM PROFILE : GAUSSIAN, $\sigma_x = \sigma_y = 0.145$ cm

➡ PROTON BEAM LAUNCH : (xo, yo, zo) = (-2.02835, 5.44336, -100.0) cm
(dcxo, dcyo, dczo) = (0.035168, -0.045786, -0.998332)

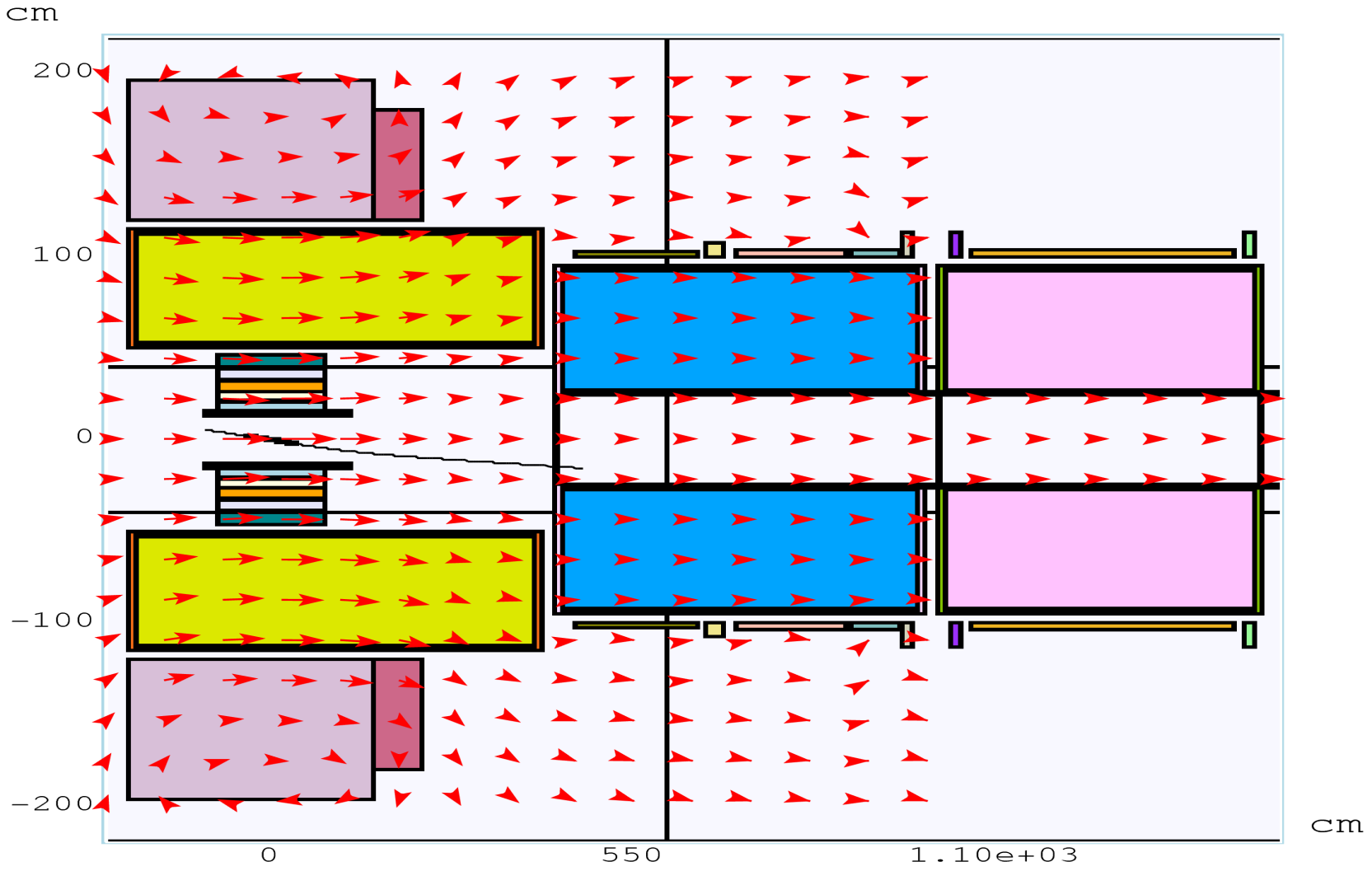
➡ EVENTS IN SIMULATIONS : N_p = 5,000,000 [TBP]

I20to2T5m: yz CROSS SECTION (x = 0.0 cm) WITH CHICANE AT THE END (+ 6.75 GeV BEAM CENTROID TRAJECTORY).

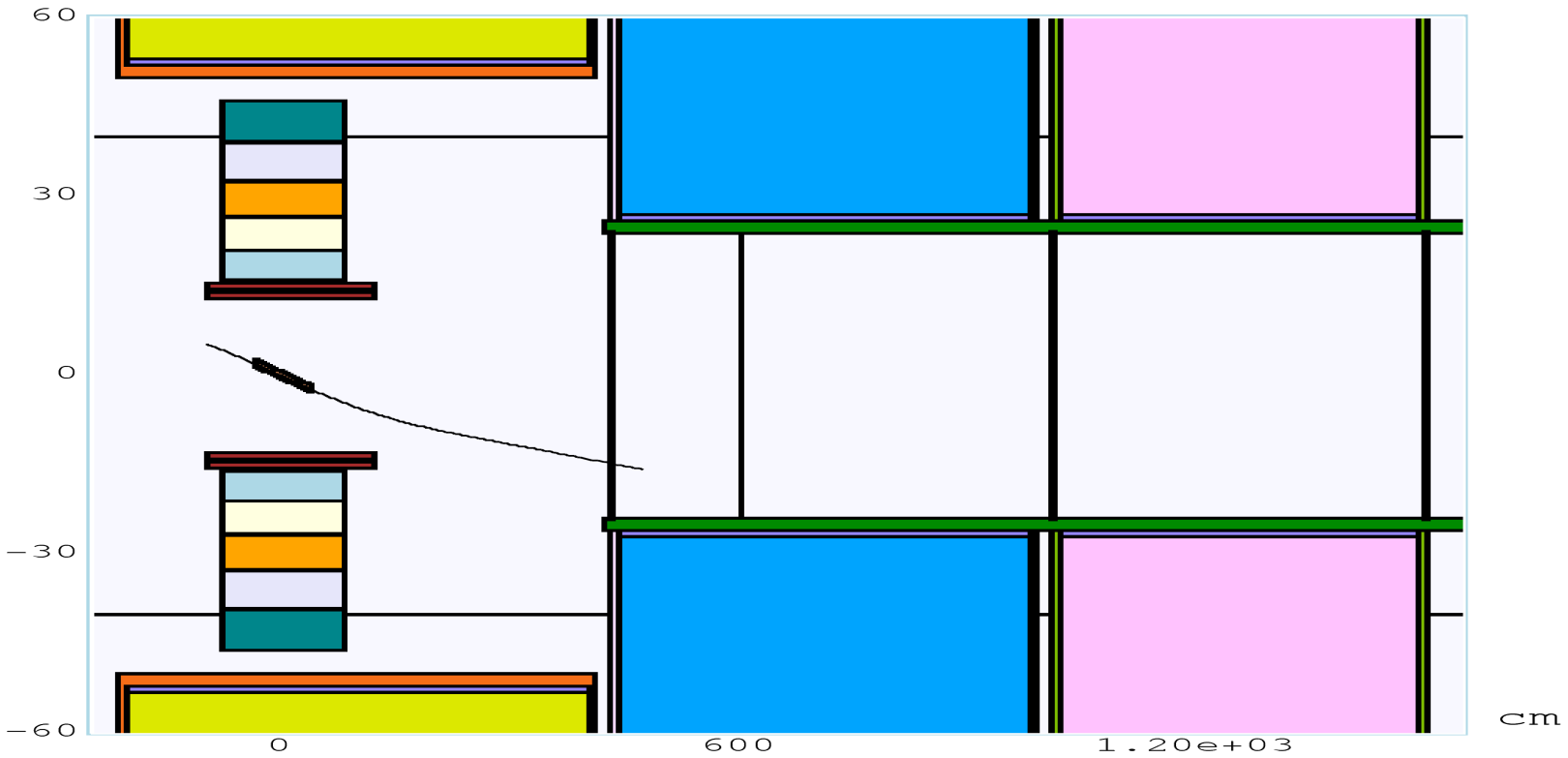


10 SC + 5 RS ==> SC#1-2 WITH IR =120 cm, dR ~ 77 / 61 cm [CRYO#1], SC# 3-7 IR=100 cm [CRYO#2], SC#8-10 IR=100 cm [CRYO#3], DISTANCE END (SC#2) - START (SC#3) = 233.08 cm, GAP#1 ~ 420.0 cm
RS#1 --> IR = 16 cm, RS#5 --> OR = 46.0 cm, SHVS#1 INNER TUBE IR = 50.0 cm, SHVS: 2 cm THICK STST TUBES, 10 cm FLANGES. 4 cm GAP BETWEEN RS#5 OR AND SHVS#1 INNER TUBE, 5 cm GAPS BETWEEN SHVS#2, #3 OUTER TUBES AND SC's IR IN CRYO#2, #3. CRYO GAPS = 20 cm ???

20to2T5m : **yz CROSS SECTION (x = 0.0 cm) WITH B FIELD MAP AND CENTROID TRAJECTORY. THE BEAM WILL REACH THE CRYO#1 UPSTREAM Be WINDOW (AT z ~ 430 cm) NEAR THE BOTTOM AREA.**



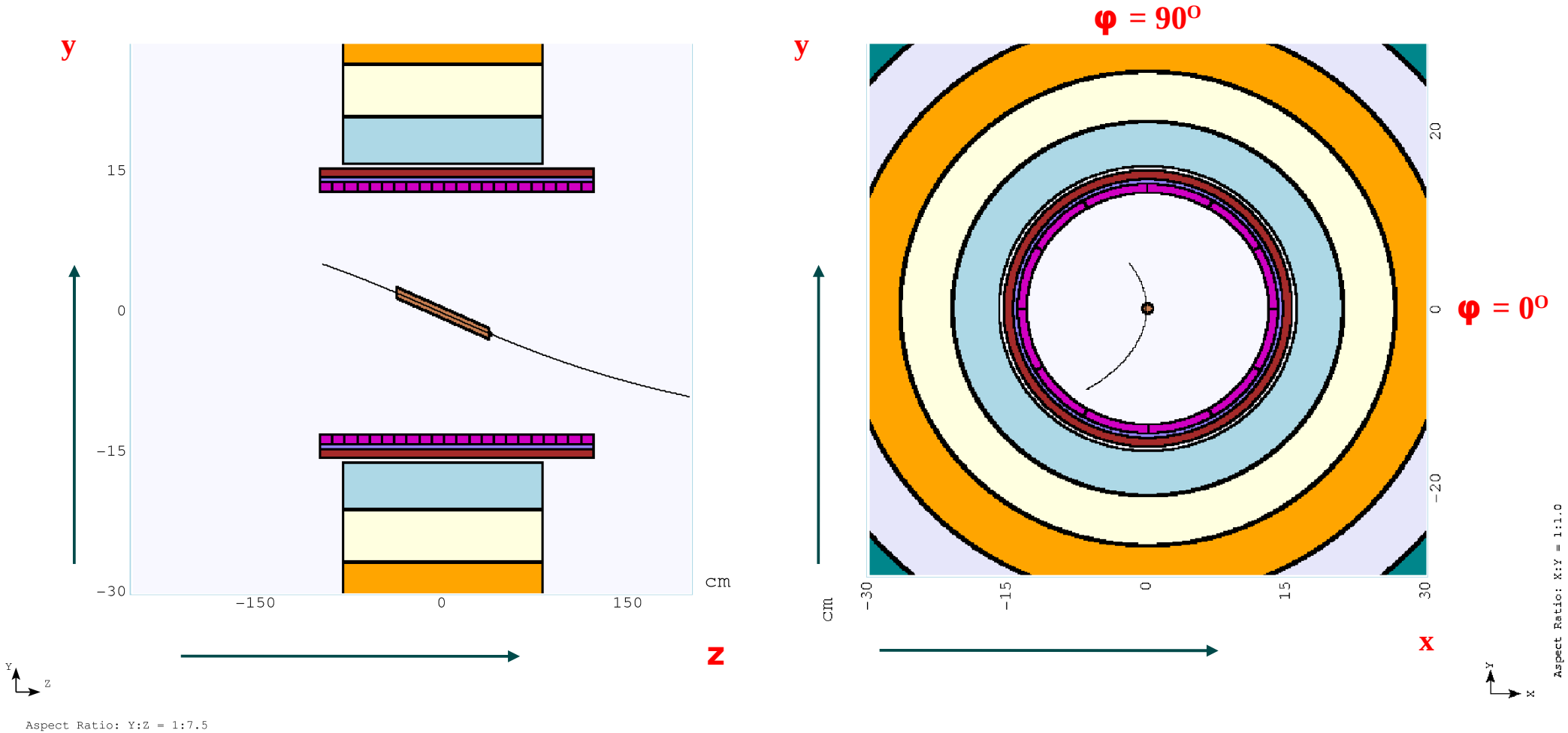
I20to2T5m: yz CROSS SECTION (x = 0.0 cm) WITH BEAM PIPE DETAILS (+ 6.75 GeV BEAM CENTROID TRAJECTORY).



BP#1: DOUBLE WALL 1 .0 cm THICK (EACH) STST TUBES WITH IR = 13.0 cm, 0.5 cm He GAP (?) AND - 99.0 < z < 121.0 cm [0.5 cm GAP BETWEEN RS AND BP#1 OUTER TUBE].

BP#3: 2 cm THICK PIPE (= SHVS#2, #3 INNER TUBE), IR = 24.0 cm AND 430.0 < z < 1600.0

BP#1 SEGMENTATION DETAILS : yz AT x = 0.0 cm [LEFT] AND xy AT z = 0.0 cm [RIGHT]
CROSS SECTION WITH SEGMENTATION DETAILS OF INNER TUBE.



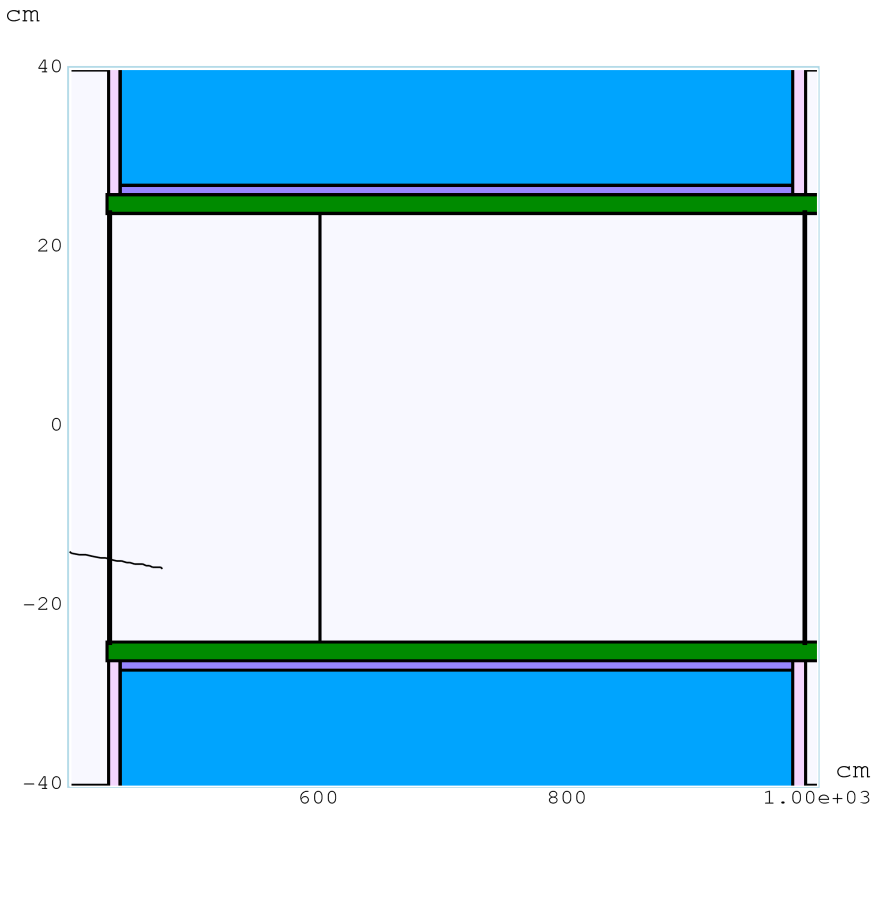
$13.0 < r < 14.0$ cm $dr = 1.0$ cm $N_r = 1$ bins

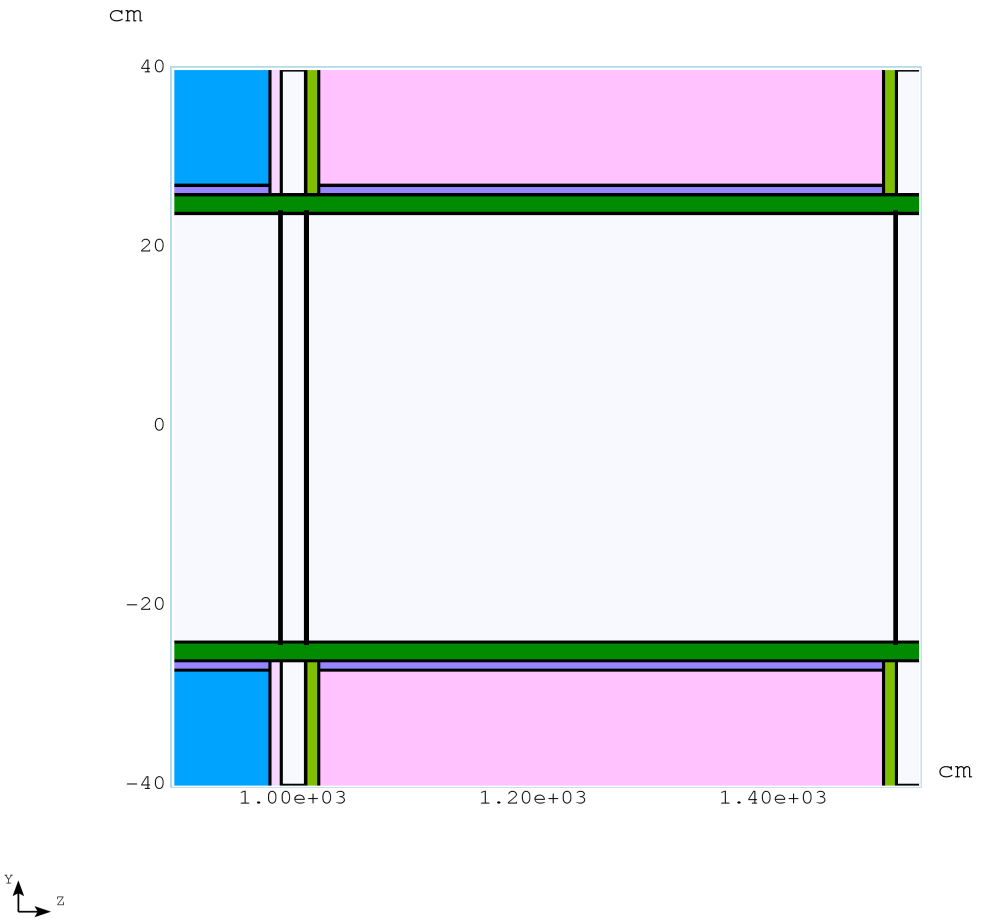
$-99.0 < z < 121.0$ cm $dz = 10.0$ cm $N_z = 22$ bins

$0.0 < \varphi < 360.0$ deg. $d\varphi = 30$ deg. $N_\varphi = 12$ bins

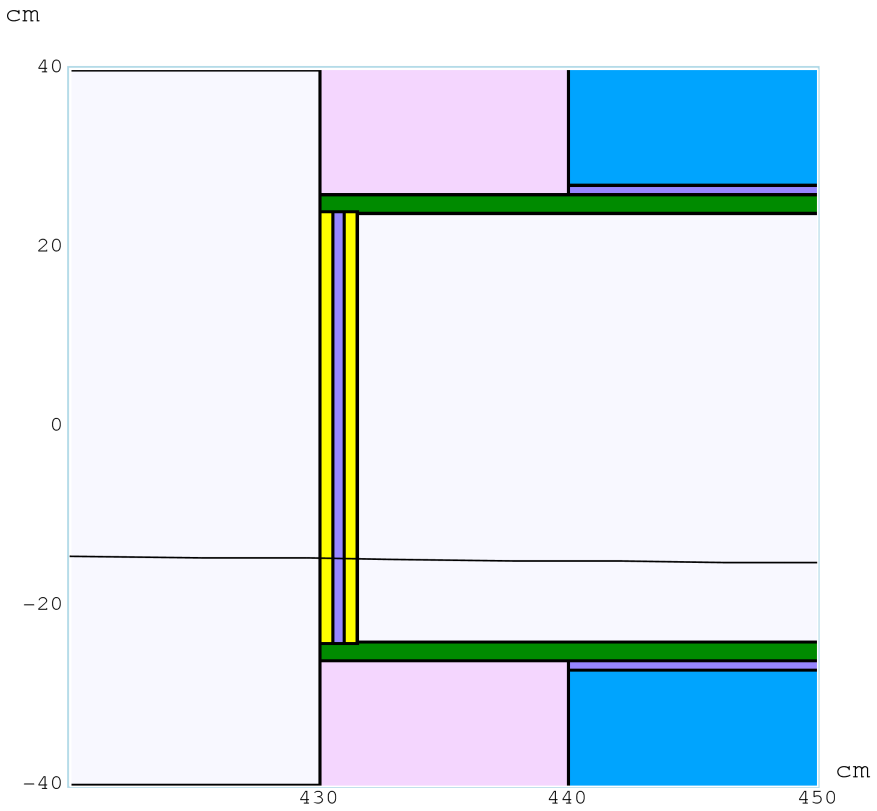
$N_{tot} = 264$ "pieces"

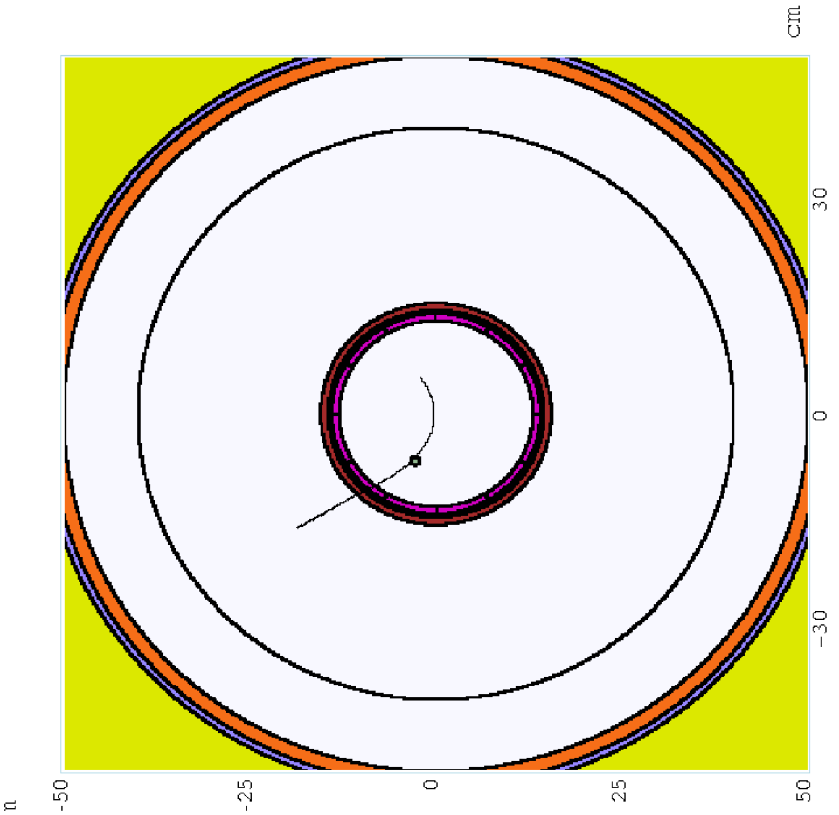
Be DOUBLE WINDOW : yz CROSS SECTION AT x = 0.0 cm WITH Be WINDOWS AT THE BEGINNING (z ~ 430.0 cm) AND THE END (z ~ 990.0 cm) OF CRYO#2 [LEFT] AND AT THE BEGINNING (z ~ 1010.0) AND THE END (z ~ 1500.0 cm) OF CRYO#3 [RIGHT]





Be DOUBLE WINDOW AND END OF BEAP DUMP : yz CROSS SECTION AT x = 0.0 cm WITH Be WINDOW DETAILS AT THE BEGINNING (z ~ 430.0 cm) OF CRYO#2 [LEFT] AND xy CROSS SECTION AT z = 112.0 cm NEAR THE END OF THE BEAM DUMP [RIGHT].

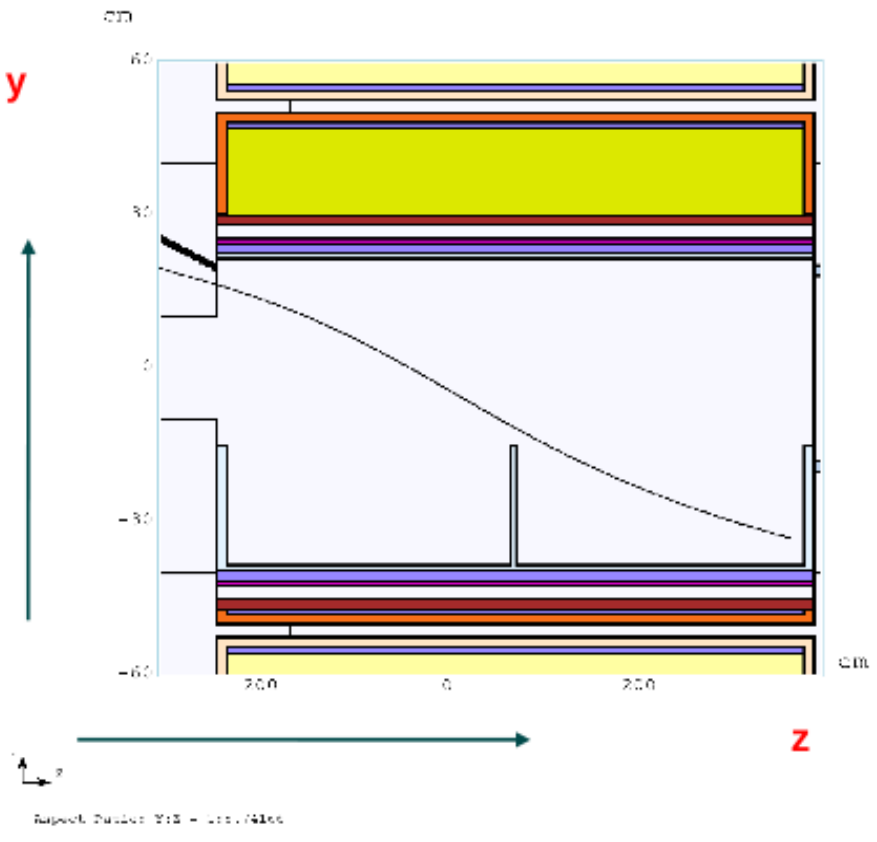


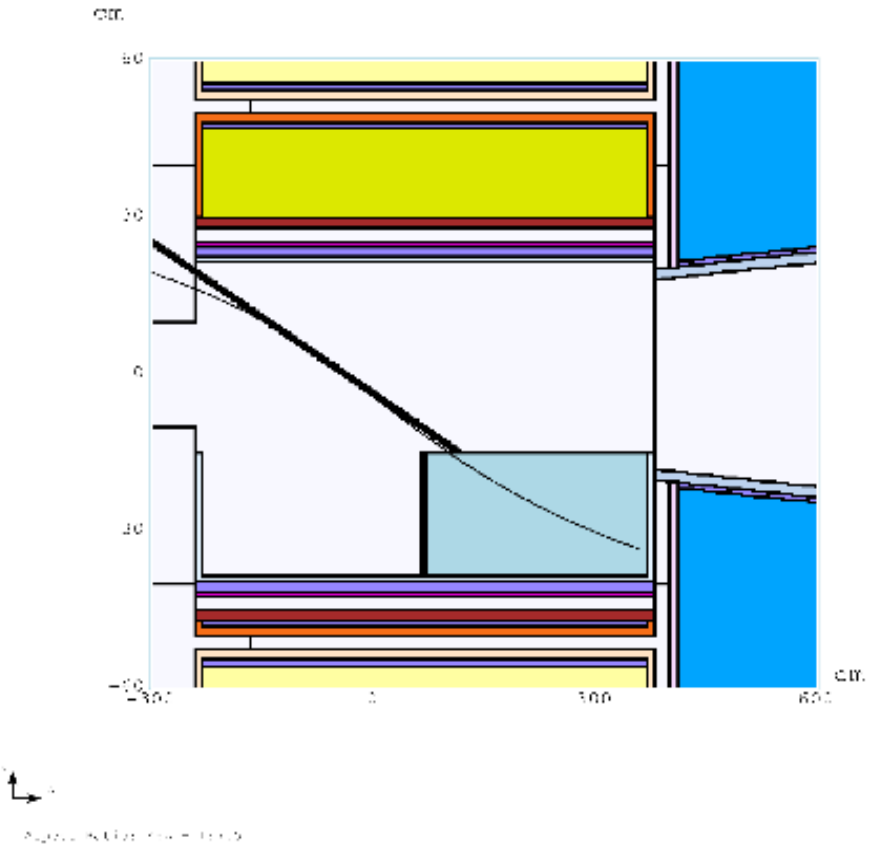


BeWind#1: DOUBLE WALL 0.5 cm THICK (EACH) WITH 0.5 cm He GAP OR 0.01 cm THICK (EACH) AND 1.0 cm He GAP (VAN) ??
He COOLING REQUIREMENTS TO DETERMINE He GAP ??

VERY THINN Be WINDOW ==> TRACKING PARTICLES PROBLEMS AND AZIMUTHAL TDPD DISTRIBUTION STUDIES PROBLEMS??

IDS120j: yz CROSS SECTION WITH THE PROTON BEAM CENTROID P12 TRAJECTORY SHOWING (RIGHT) AND WITHOUT SHOWING (LEFT) THE Hg POOL AND Hg JET.





PROTONS ENTER THE Hg POOL AT (x, y, z) ~ (- 1.61, -15.00, 104.66) cm AND WILL BE STOPPED BY THE SIDE (SEMICIRCULAR) WALL AT (x, y, z) ~ (-19.39, -33.26, 358.80) cm (~ 10 cm BEFORE THEY REACH THE RIGHT SIDE FLANGE OF Hg MODULE) COVERING A DISTANDE ~ 255.41 cm ~ 17 IL (1 IL ~ 15 cm).
IS IT POSSIBLE FOR POOL TO BE SORTER AND FILL THE REST OF THE UPSTREAM VOLUME WITH SHIELDING ?

NOTICE : R1, HU (HL ?) DIMENSIONS OF Hg MODUL ARE DETERMINED FROM THE SPACE NEEDED FOR THE PROTON BEAM TRAJECTORY. DIFFERENT INJECTION POINTS WILL PROBABLY REQUIRE DIFFERENT VALUES FOR THESE PARAMETERS.

IDS120j: yx (AT z = 200 cm) (LEFT) AND xz (RIGHT) CROSS SECTION WITH THE PROTON BEAM CENTROID P12 TRAJECTORY.