

# Update on Target Vacuum Can

Shigeyuki Tajima  
(University of Virginia)

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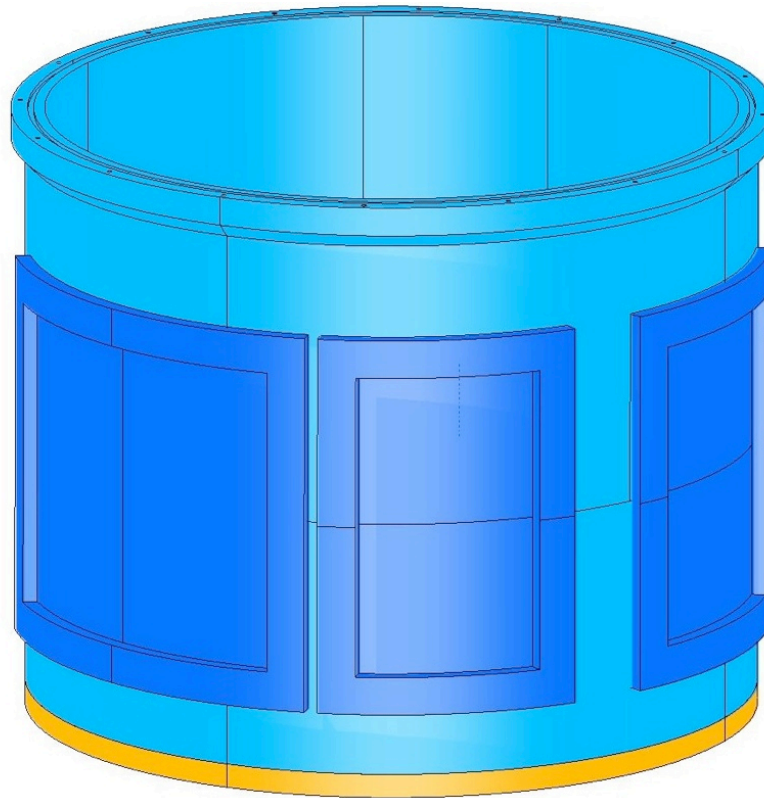
- OVC Design for **SANE**, **Semi-SANE**, and **Real Compton** experiment

## Current Status

- Window design has been modified slightly because the Real Compton collaboration requested that the can needs to be rotated by 5 deg clockwise for their measurement.
- Design of nitrogen shield, which was submitted in March, was also updated.
- Mike Fowler has started the engineering work.

## Overview of the vacuum can (May '06)

- Inner radius is 17.94in = 45.6cm. Wall thickness is 0.935 in.
- Each Aluminum window is a dished window and has a thickness ~0.013in
- SANE OVC drawing made by M. Fowler



## Kinematics for SANE, Semi-SANE, and Compton experiments (As of May. '06)

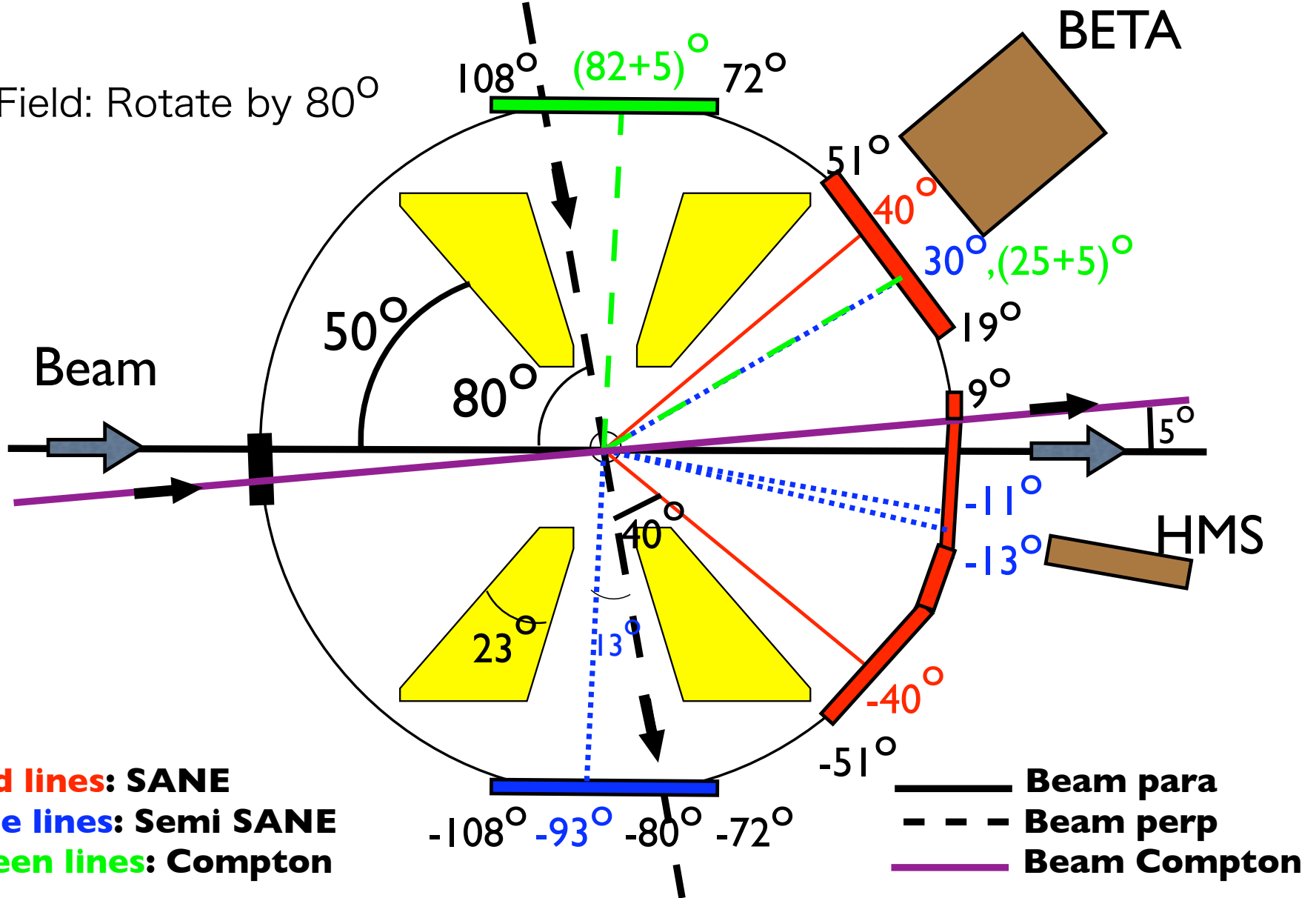
	Beam Energy (GeV)	BETA energy (GeV)	BETA Angle (deg)	$P_{\text{HMS}}$ (GeV/c)	HMS angle (deg)	Target Field	Run type	Beta Distance (m)
<b>SANE</b>	4.8, 6.0	0.8-2.2	40	--	--	// $\perp$	Production	3.5
	6.0	--	--	1.0-1.7	36-44	//, $\perp$	$e^+$ BG $\perp$	3.5
	2.4	1.3-1.8	40	1.1-1.7	33-48	//, off	Calibration: ep elastic	3.5
<b>Semi SANE</b>	6.0	0.6-2.0	30	2.7	10.8	//	Production	3.5
	6.0	0.6-1.4	40	4.0	13.1	//, $\perp$	(Parasitic during SANE)	3.5
<b>Compton (*)</b>	4.8	(3.0)	25	2.0	39	off	Calibration: ep elastic	7.0
	4.8	(0.9)	82	4.3	12	// ( $5^\circ$ )	Production	2.5

(\*) OVC will be rotated by  $5^\circ$  clockwise

# OVC Windows (updated in May '06)

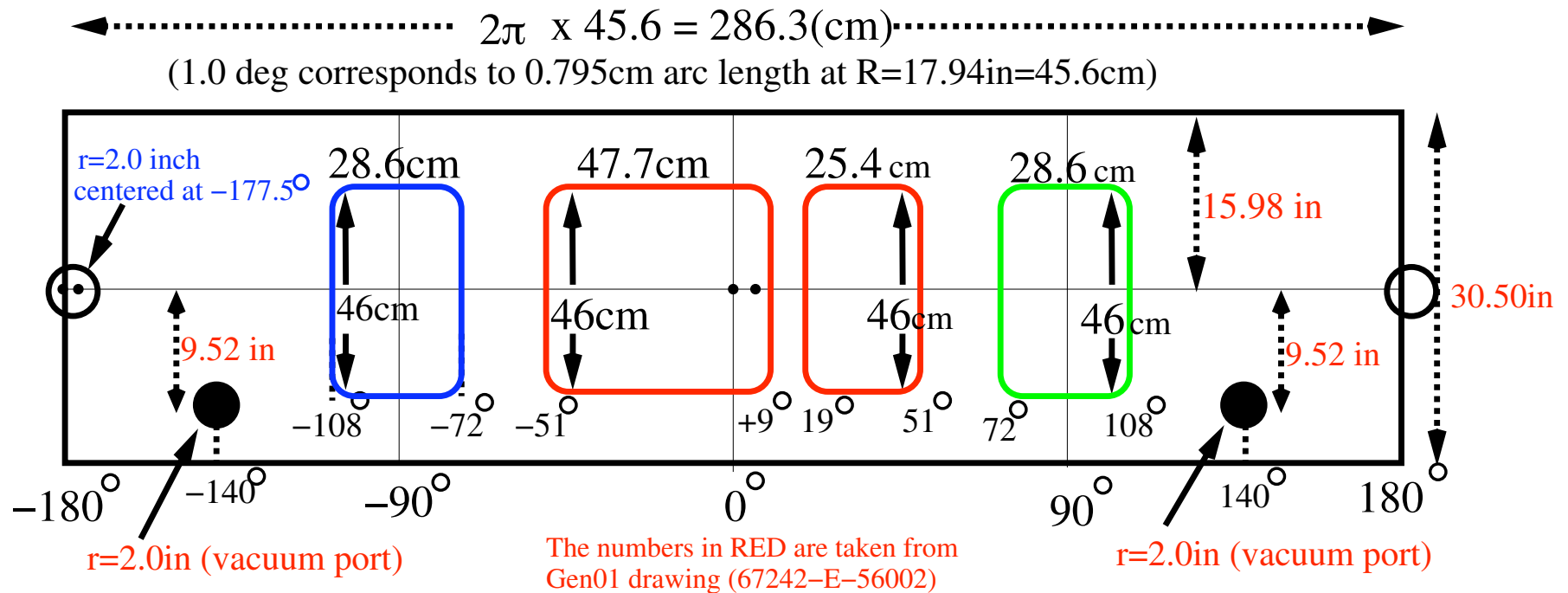
R=45.6cm

⊥ Field: Rotate by 80°

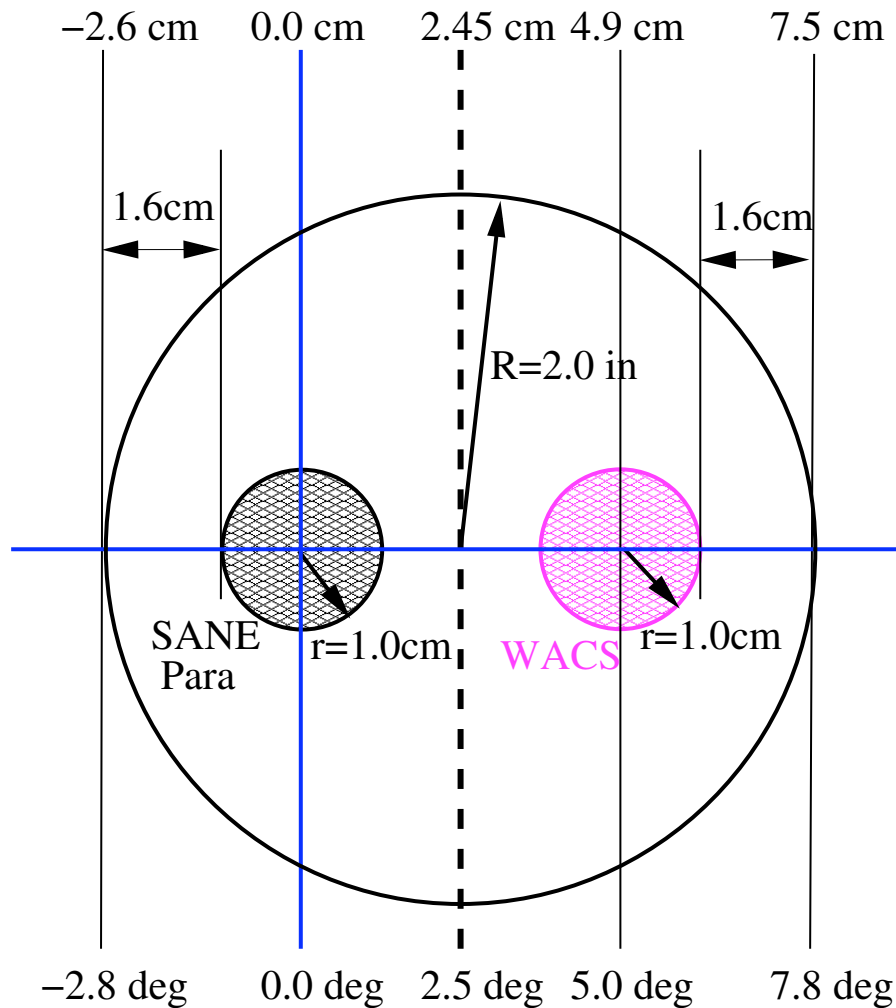


# OVC Window locations and dimensions (updated in May '06)

- Roll-out view of the OVC with the inner radius of 45.6 cm.
- Corners of square window are rounded ( $r = 5\text{cm}$ )



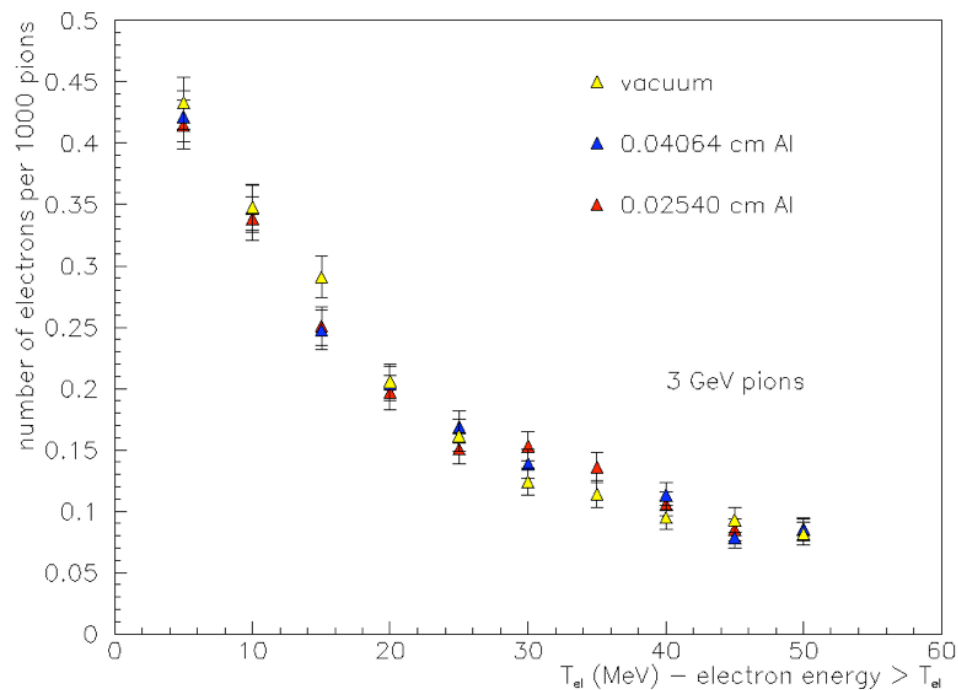
# Beam entrance window and raster regions (May '06)



- Beam entrance window made of Be will be at  $\sim 22$ in from the center of the target.
- We require a minimum clearance of  $1.2$ cm around each raster region.
- The diameter of Be window needs to be  $3.7$ in or larger.
- A Be window of  $4$ in diameter (thickness  $\sim 0.02$ in) may be available at JLab according to M. Fowler

# Study of pair production and window thickness (done by Vipuli)

- Exit Al windows (0.010in and 0.016in thick) and vacuum
- 1, 2, 3 Gev Pions
- The window thickness does not make a huge difference in the total number of delta-rays for the two Al thicknesses considered.

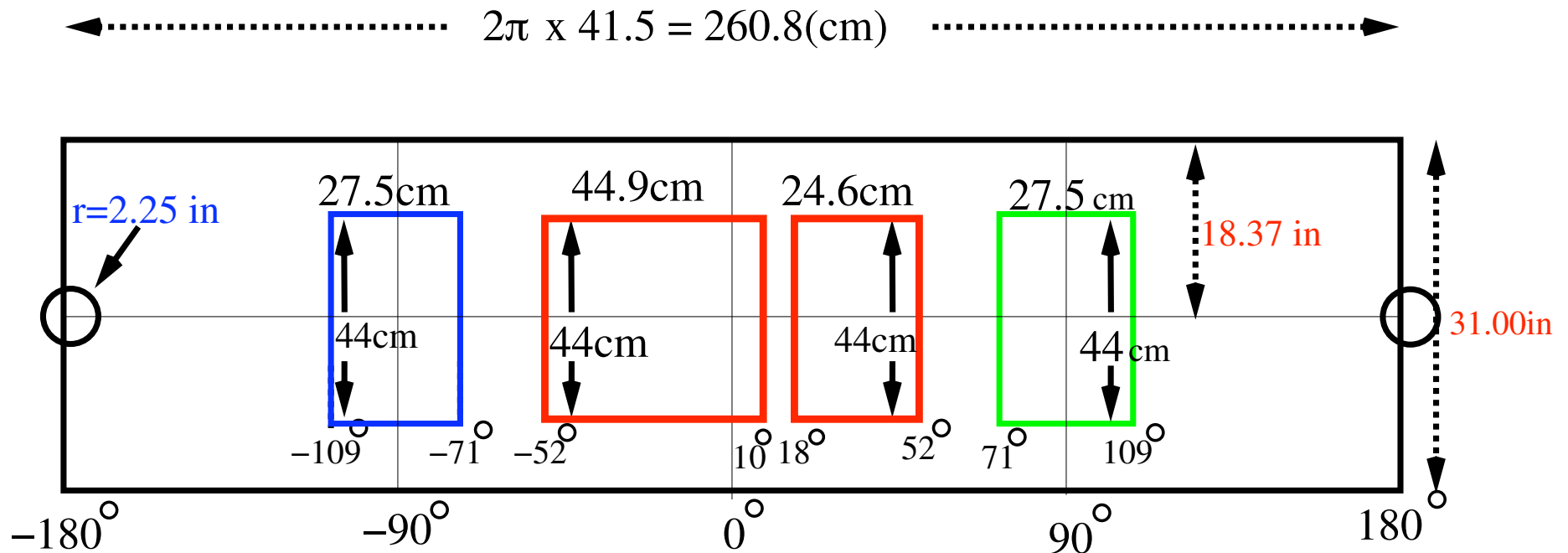


The pion threshold is 5.9 GeV for SANE cherenkov. This corresponds to a 21.5 MeV electron threshold.



# Nitrogen Shield Window locations and dimensions (updated in May, 2006)

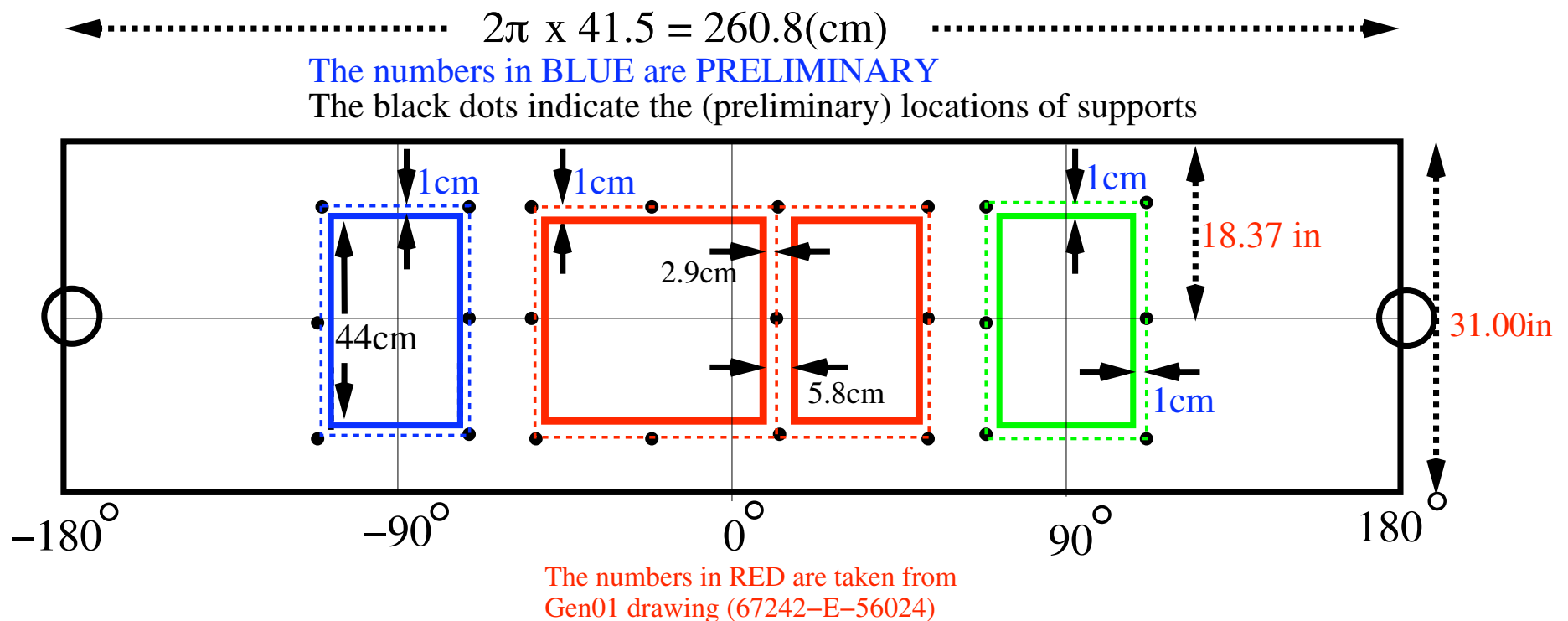
- Roll-out view of the Nitrogen Shield can with the inner radius of 41.5 cm



The numbers in RED are taken from Gen01 drawing (67242-E-56024)

# Nitrogen Shield: Frame locations and dimensions (updated in May, 2006)

- A frame (dashed line) for Al foil or super insulation is mounted at each large window on LN2 can. It will be located at 3mm outside of the LN2 can. (Solid lines are LN2 windows)



# Timeline

- **Need to re-submit the OVC and nitrogen shield designs** (after Real Compton people confirm the changes they requested)
- **Engineering calculations and drawings** (3-4months) (P. Brindza, M. Fowler, S. Lassiter, and others)
- **Manufacturing of OVC** (~6months including bidding period)
- **Testing the OVC** (in 2007)(M.Seely)