



SiD MDI Issues

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Beijing ACFA/GDE Meeting
05 February 2007



Issues : No Definite Solutions

Surface Assembly and Underground Halls

Space and Crane Requirements

Detector Access Model in Push-Pull Scheme

QD0 cryostat and support

Anti-Solenoid

Liquid Helium Supply

“R20” detector package- Support and Alignment Model

Beampipe and VXD

Forward Tracker

Lumical, Beamcal & Masks

Not Covered Today

Detector Shielding Model

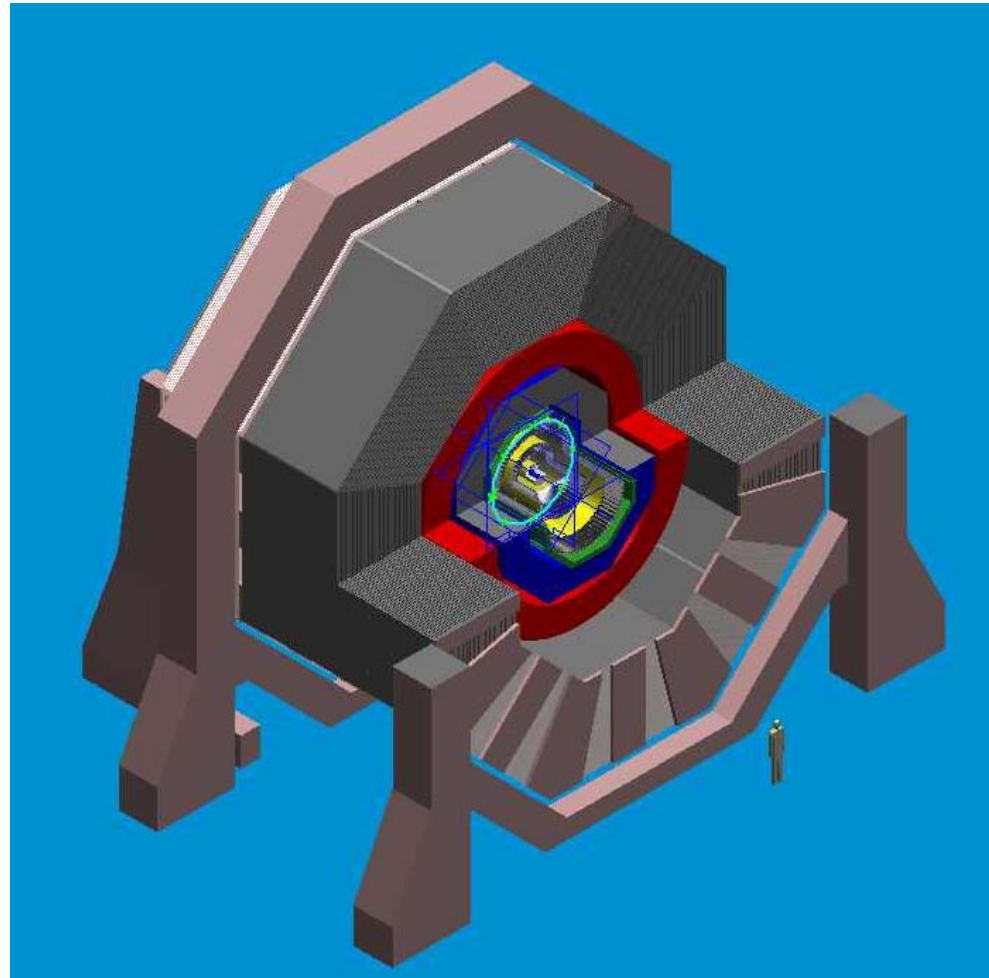
DID & Solenoid Field

Calibration Scheme in Push-Pull

Background Simulations



SiD Assembly Movie





Sequence of Operations

- **Detector subassembly construction & surface tests**
 - Octants of muon chamber instrumented barrel yoke, barrel Hcal, barrel Ecal
 - Four sub-modules of EC return flux instrumented with muon chambers, donut Hcal, Ecal
 - Tracker, vertex and FCAL packages
- **Surface Magnet test**
 - Assemble barrel support and the bottom 5/8 flux return octants
 - Drop in coil & cover with remaining 3/8 octants
 - Assemble two door legs and 4 360° (180 °?) plates of flux return
 - Test magnet and disassemble
- **Lower detector**
 - Reassemble lower barrel with supports below ground
 - Load barrel HCAL and ECAL modules into coil cryostat via threaded beam
 - Lower loaded coil package and capture with upper barrel yoke segments
 - Depending on crane capacity
 - **Lower fully assembled door**
 - **Lower door pieces, the last plate with the Endcap Ecal & Hcal, and reassemble**
- **Tracker, VXD and FCAL installed below ground at last minute**



A Surface Assembly Scenario for SiD

M. Breidenbach -1 August 2006

M-Tons	Stainless HCAL Radiator		Tungsten HCAL Radiator	
	Barrel	Endcap x2	Barrel	Endcap x2
EM Cal	59	19	59	19
HCAL	354	33	367	46
Coil	160		116	
Iron	2966/8= 374.5	2130/4= 532.5	1785/8= 223.125	1284
Support x 2 (each ~5%Fe)	150	110	90	65
Total to Lower	Loaded Coil=573	Assembled Door=2402	Loaded Coil=542	Assembled Door=1479
Shaft Diameter(m)	8.3m	10.4+2.0m		



Pre-Push Pull, 20mrad crossing angle, $L^*=3.5\text{m}$ Final Doublet Support and Access Plan

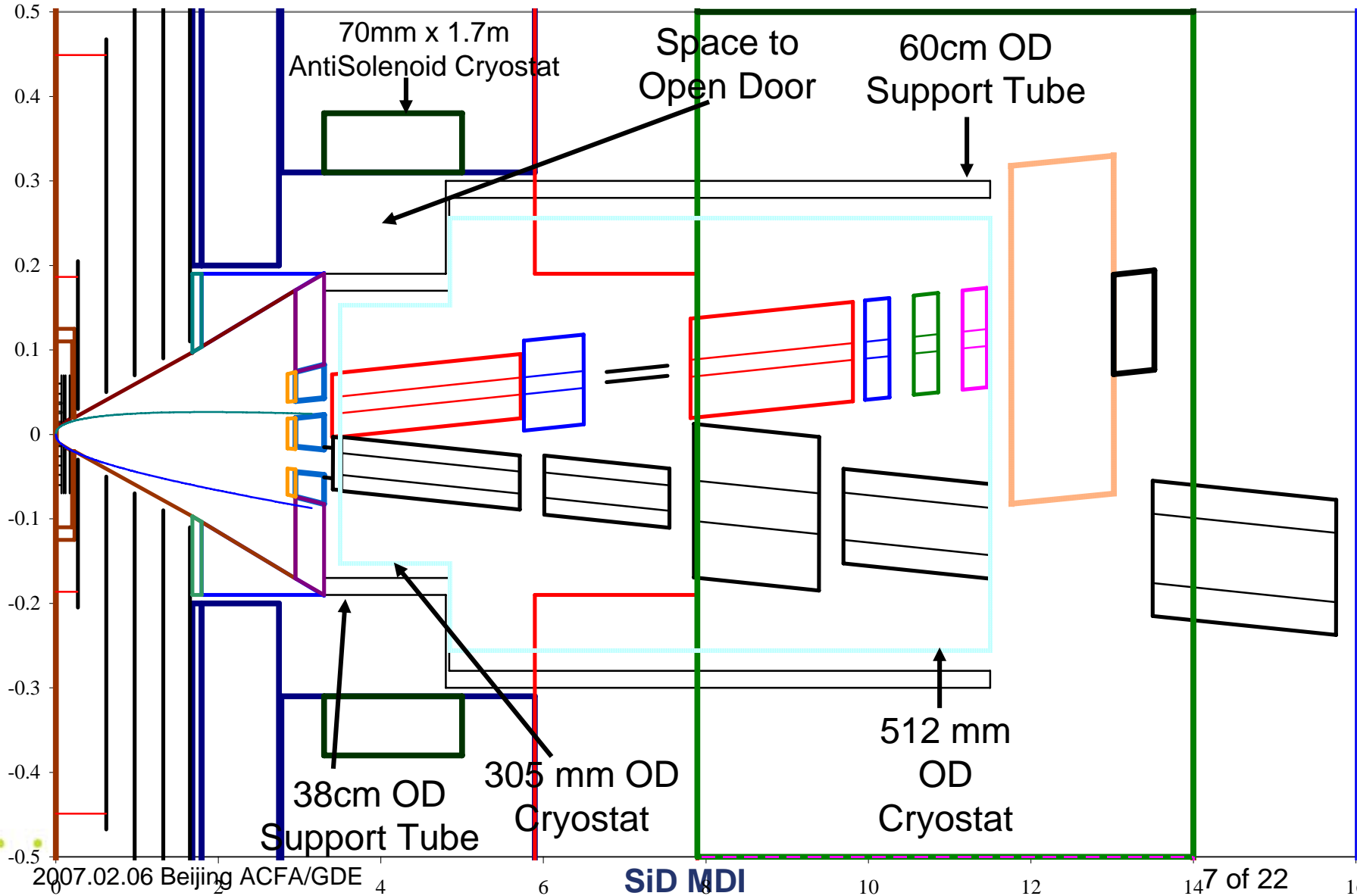
- One cryostat with radial step support tube with corresponding step
- Cryostat step @ $z=4.8\text{m}$: door can open 2m; radii from BNL

Theta	OD1	OD2
14 mrad	290mm	477mm
20mrad	305mm	512mm

- Tube cantilevered from removable base just behind closed end cap door
- Full coverage endcap Ecal/Hcal @ $r>20\text{cm}$
- Forward instrumented steel return flux cut back $\sim 10\text{cm}$ to clear step in cryostat when door open
- Antisolenoid cryostat begins at $r=30\text{cm}$



2006-05-07 BNL Discussion



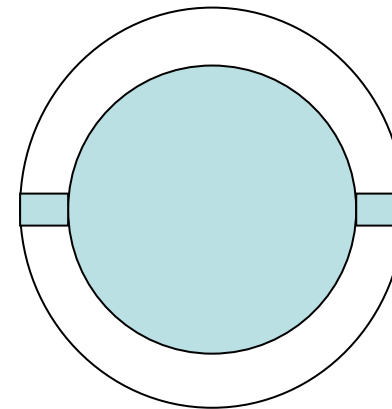
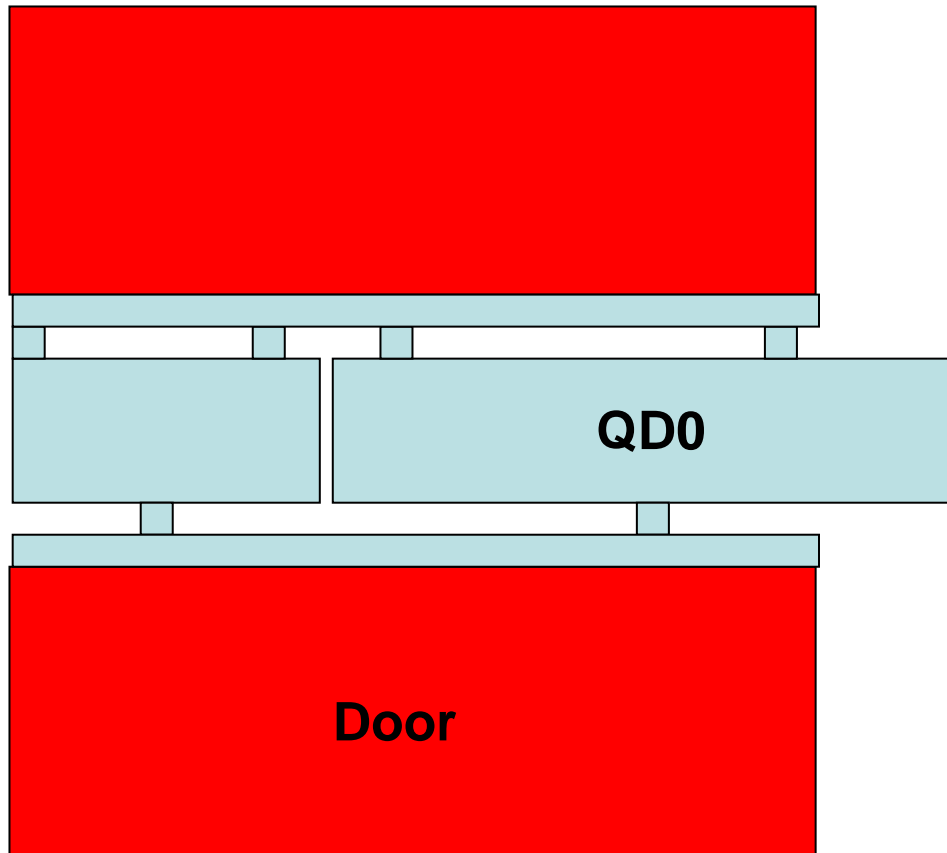


SiD Final Doublet Support and Access Plan with Push Pull @ 14mrad Crossing angle, $L^*=3.51\text{m}$

- Three concepts
 - **Drop idea of cantilevered support tube**
 - QD cryostat and FCAL package **supported off rails in endcap doors**
 - Rails incorporate **telescoping “rail extensions”** to support cryostat and FCAL when door is open
 - **Permanent liquid He feed line from barrel to QD0 with loop large enough to allow 3m door opening**
 - **5cm (?) radial cutback in endcap door iron to allow it to pass over QF1 cryostat with antisolenoid cryostat beginning at $r=30\text{cm}$**

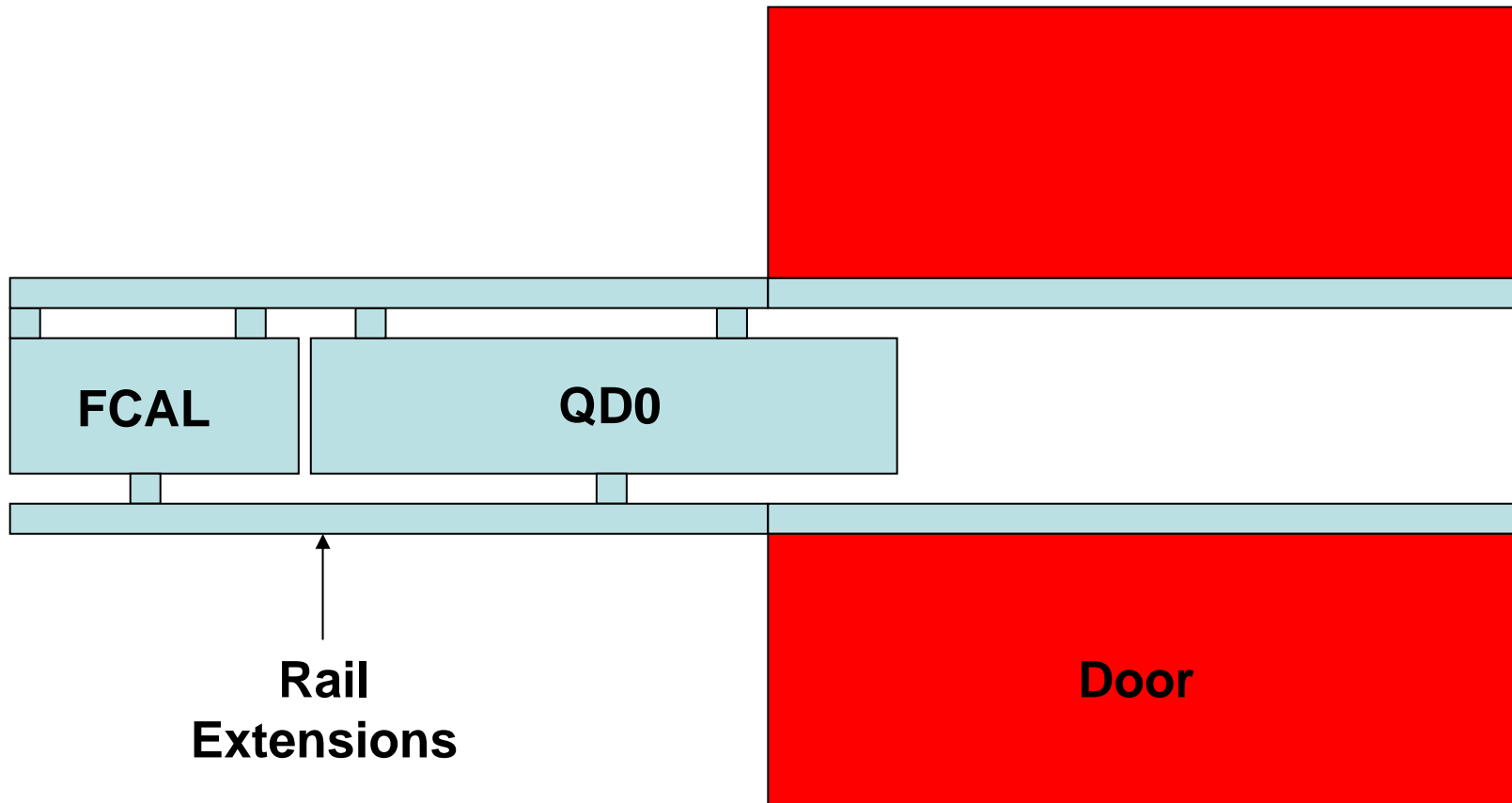


Plan & Elevation View of FCAL/QD0 Support



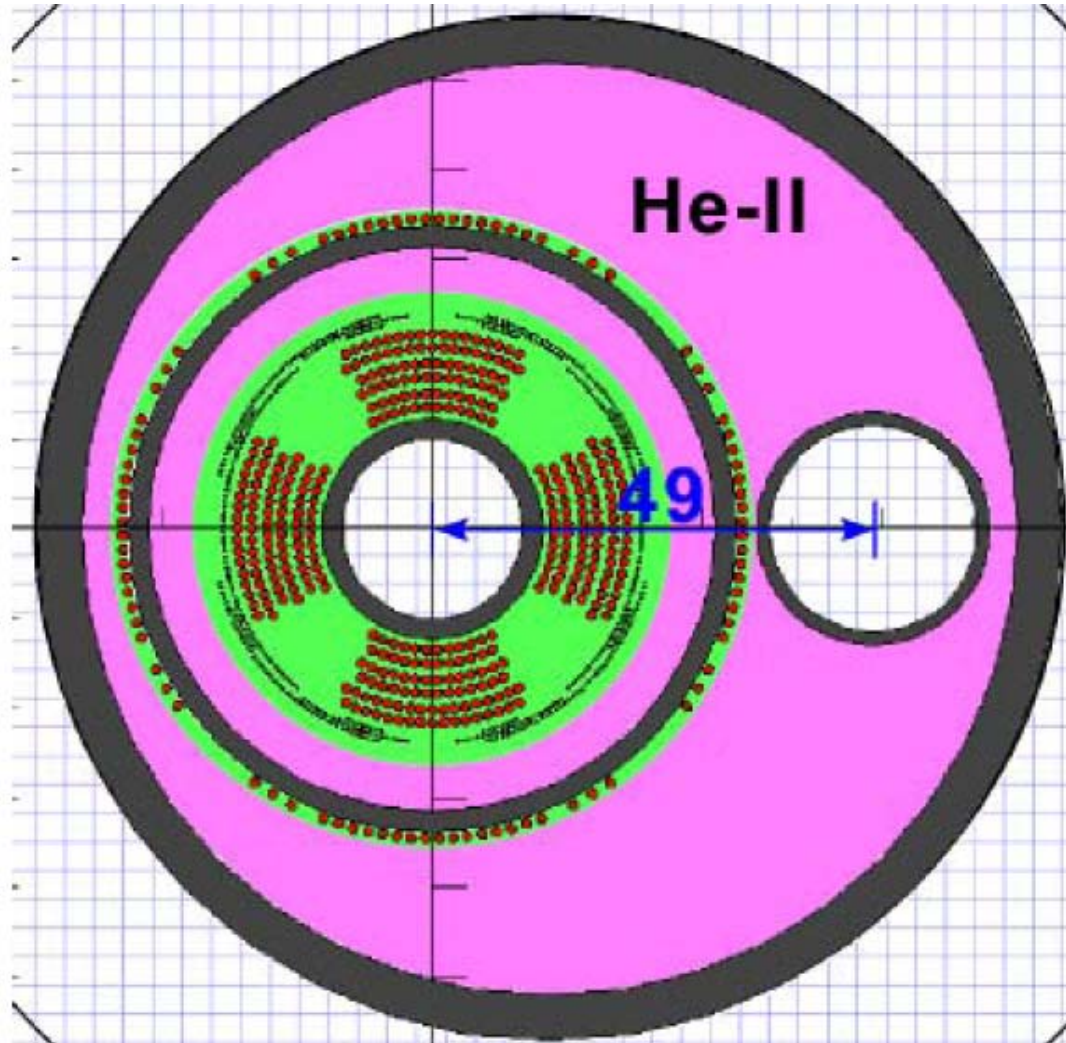


FCAL/QD0 Supported with Door Open



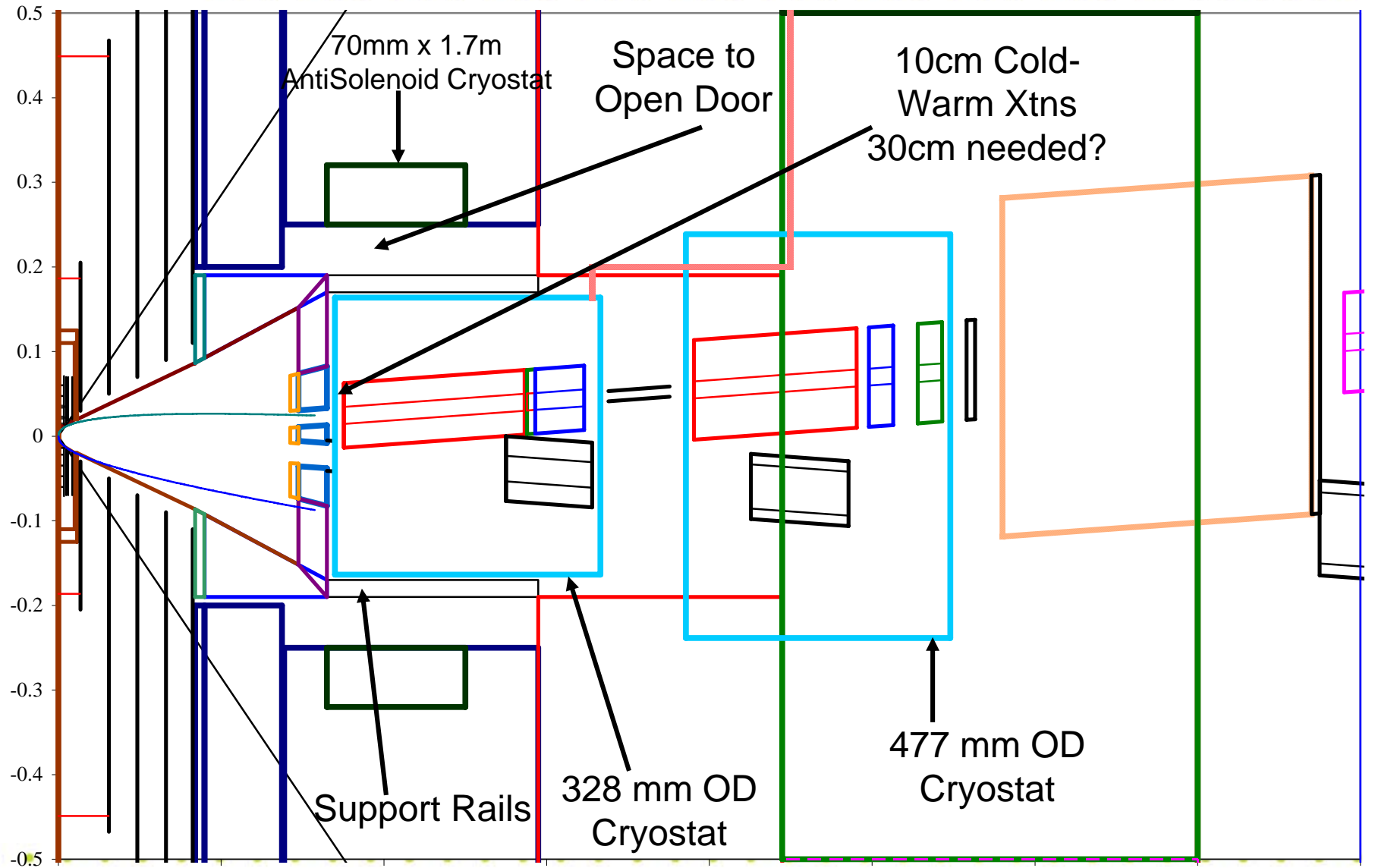


Cross Section of QD0 Cryostat at $z=3.5\text{m}$



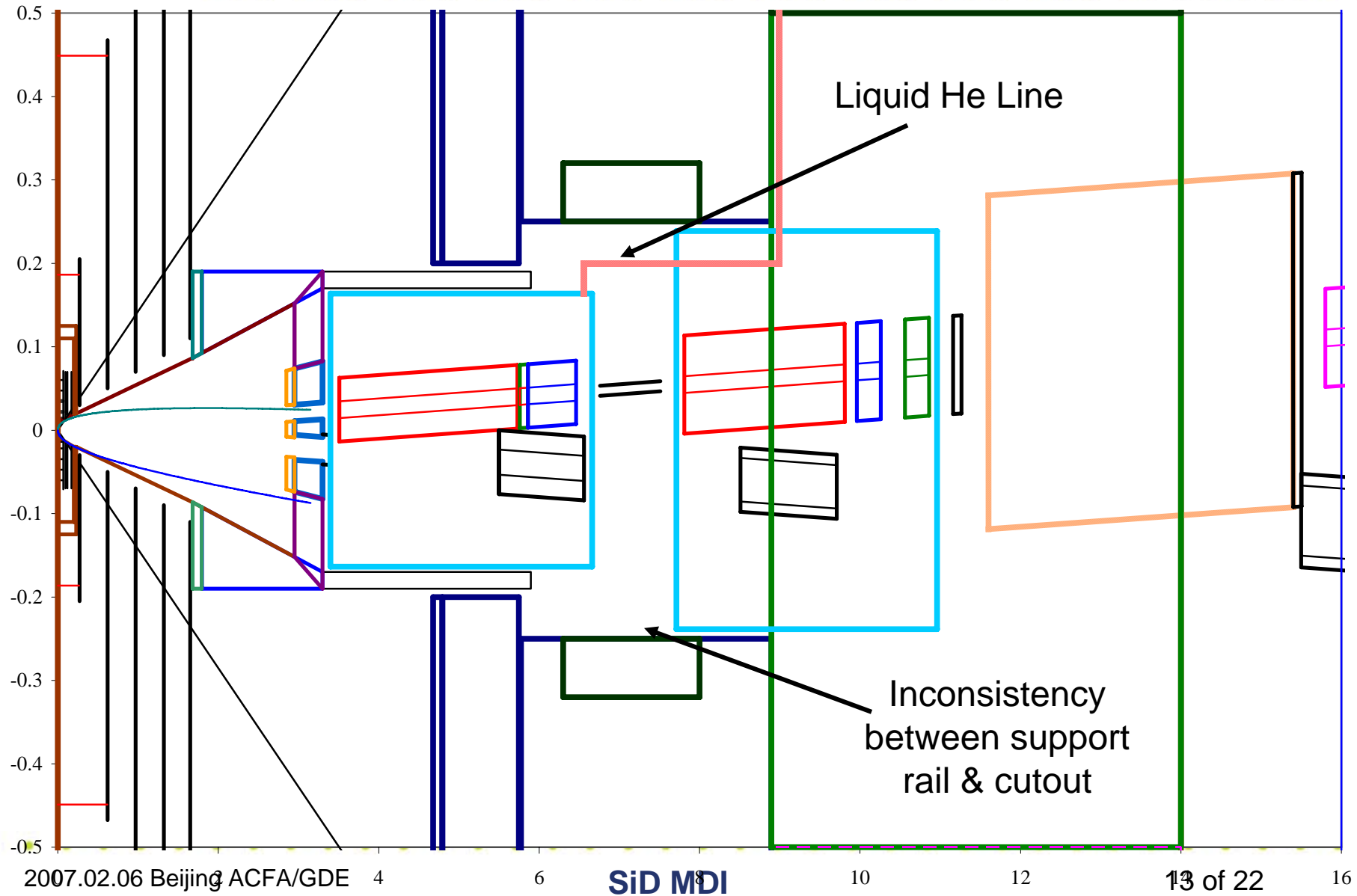


SiD $r < 50\text{cm}$, $L^* = 3.5$, 14mrad Crossing Angle, Push-Pull, Door Closed



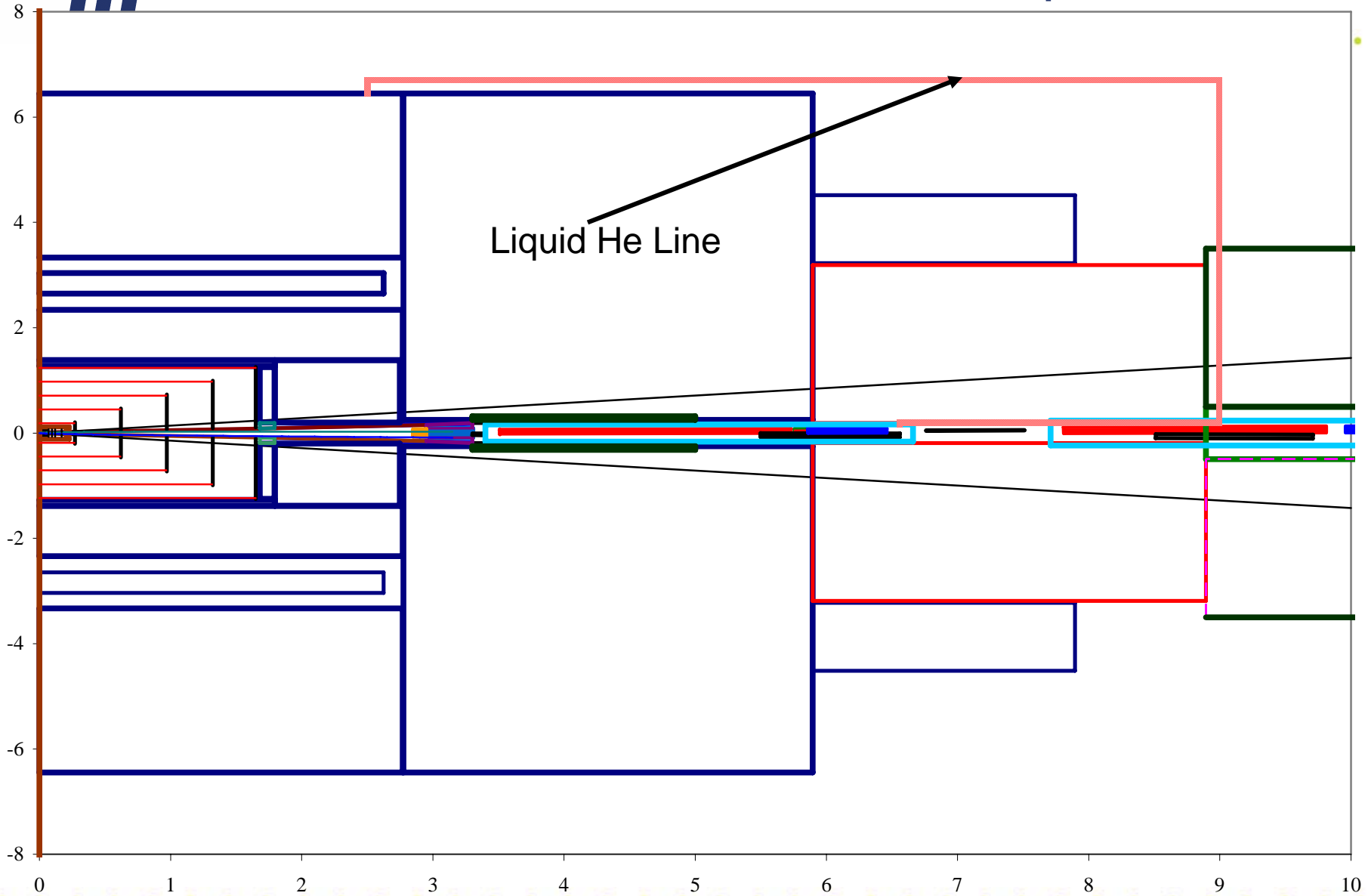


SiD $r < 50\text{cm}$, $L^* = 3.5$, 14mrad Crossing Angle, Push-Pull, Door **Open**



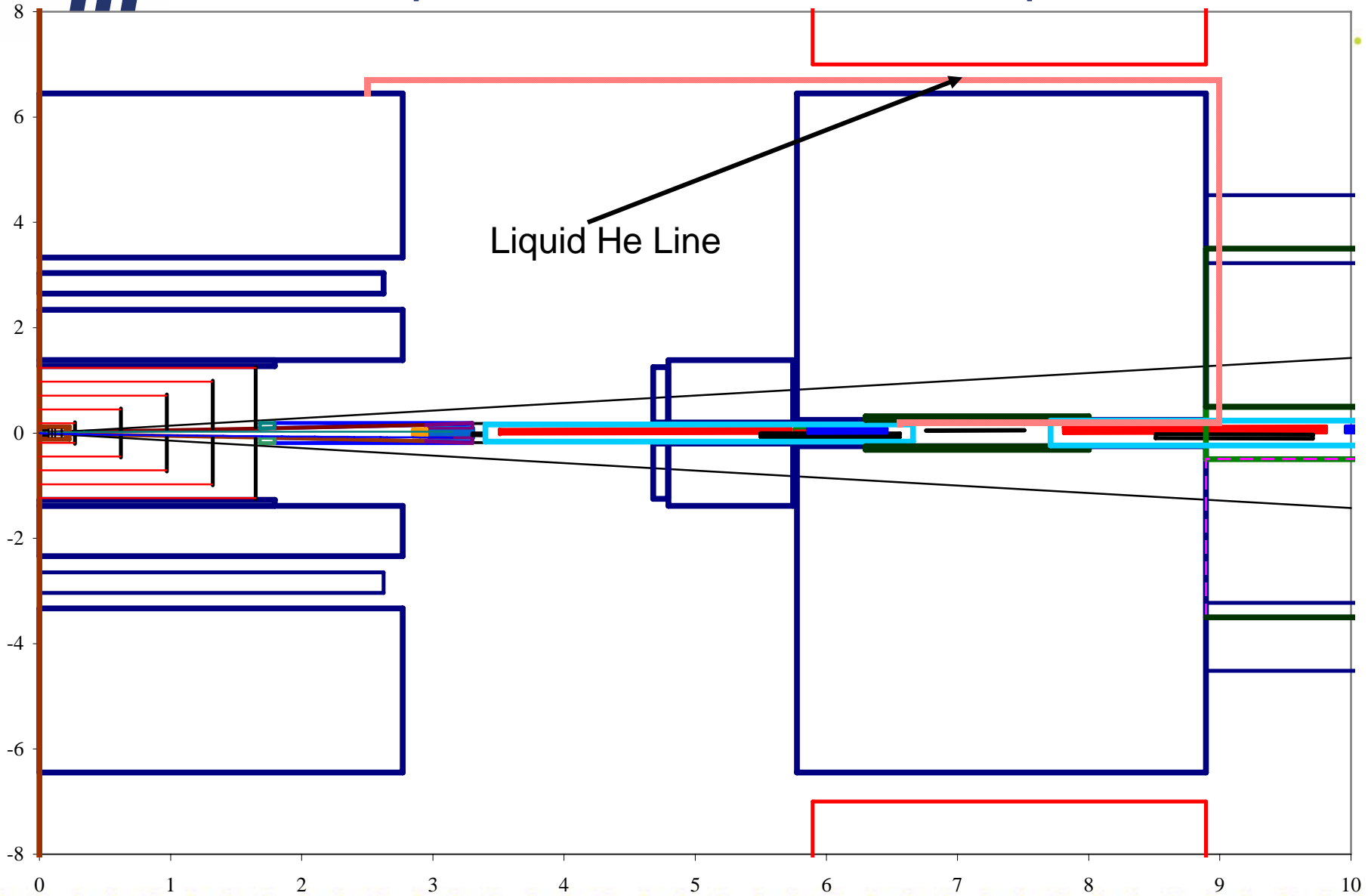


Door Closed, Permanent QD0 Liquid He Line





Door Open, Permanent QD0 Liquid He Line



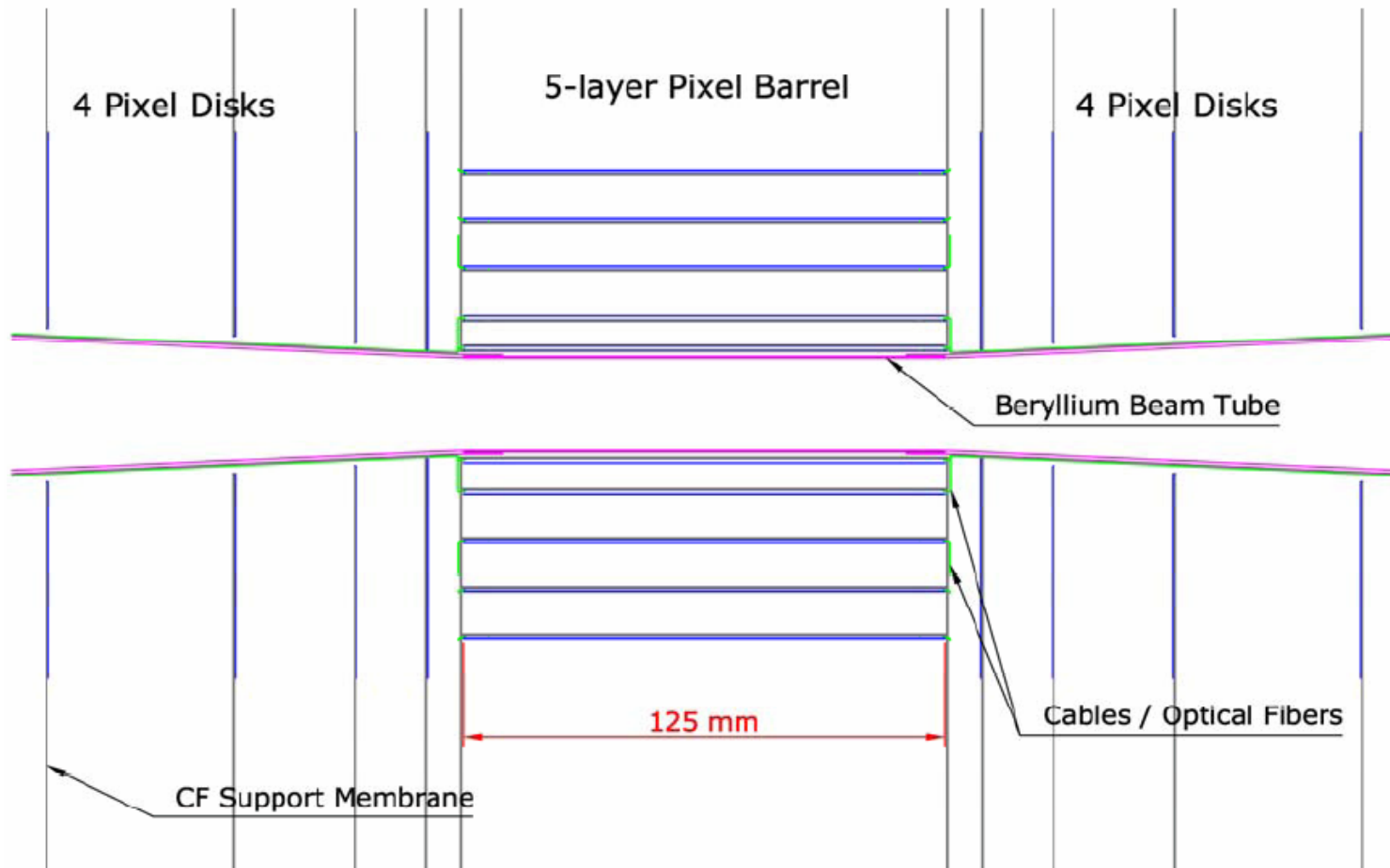


R20 Tracking, Beam Pipe and FCAL Details Need Consistency Check

- In my personal view handshake between Tracker people, VXD people, FCAL people, Recon people, Management people and MDI people not made yet
- VXD cryostat now a CF support tube hanging from Beam Pipe and in turn supporting VXD Barrel and 7 endcap layers
 - **Who supports beampipe?**
- FCAL interplay with Forward tracking and Beampipe not globally resolved
- Interference between forward tracker & FCAL during VXD access
- No conceptual solutions yet for Flanges, Bellows, Alignment, Cable and Cold Gas Access
- All Good Topics for SiD April 9-11 Collab Mtg @ Fermilab

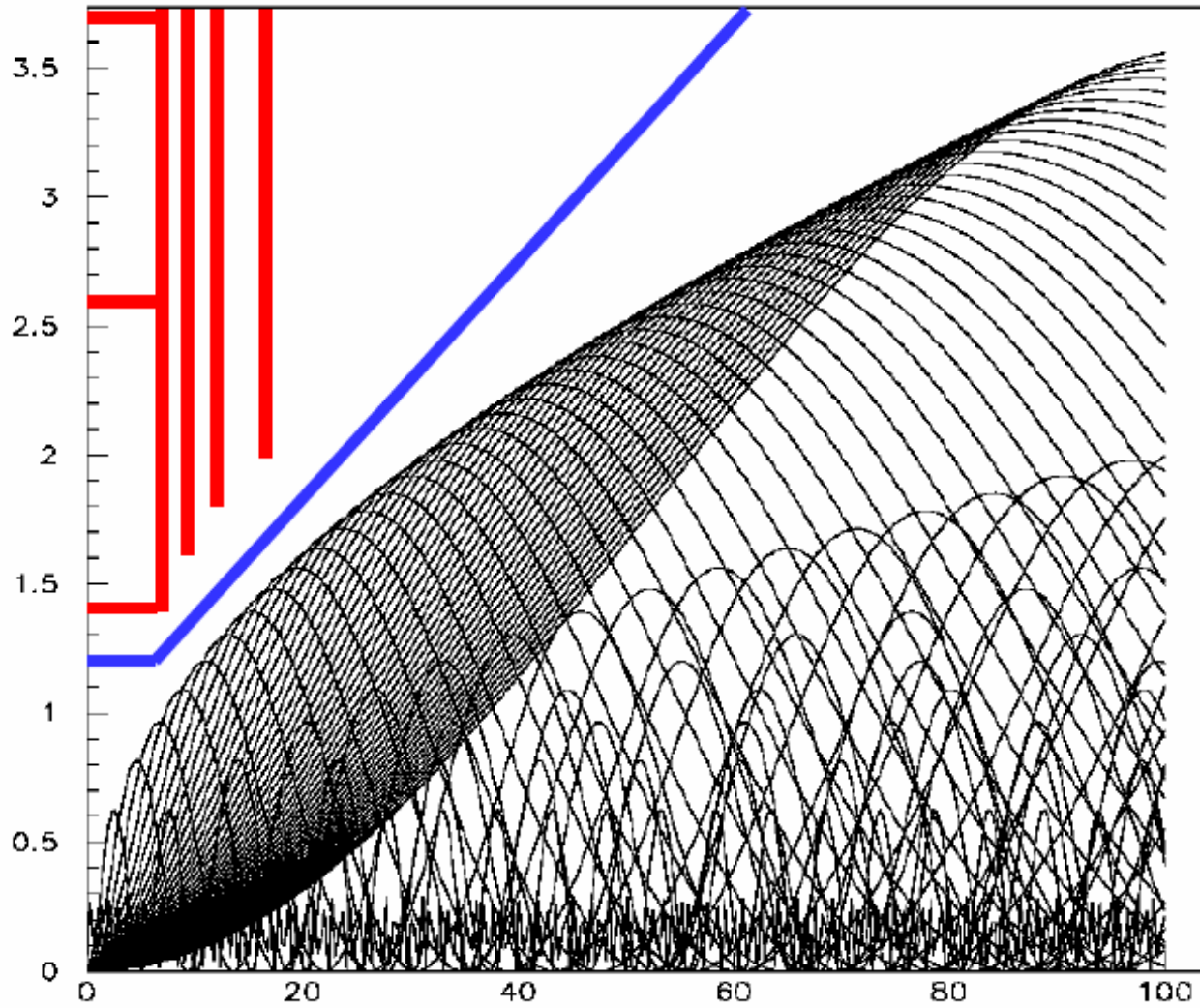


R-Z View of the Pixel VXD



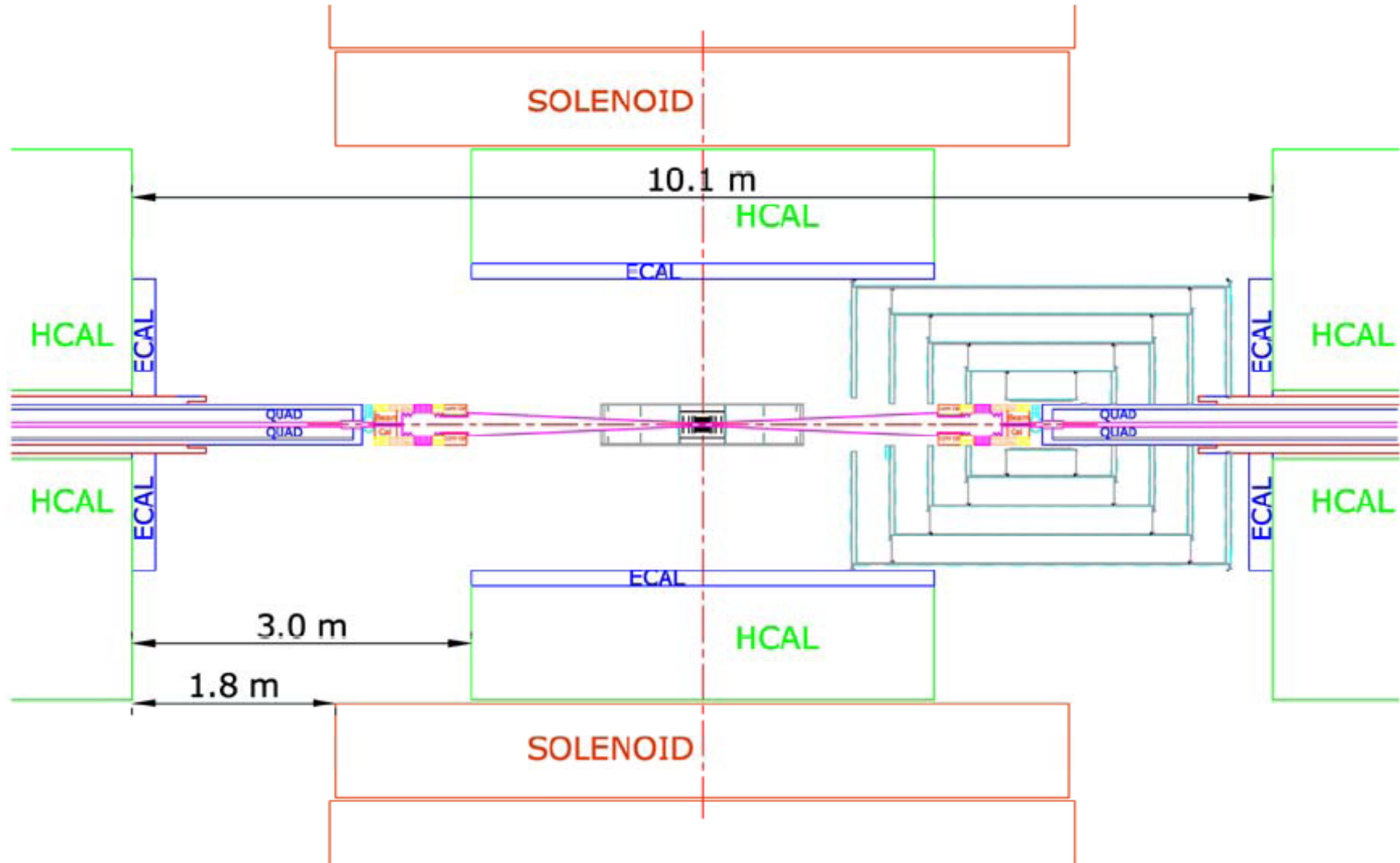


12mm Beam Pipe and VXD Detail



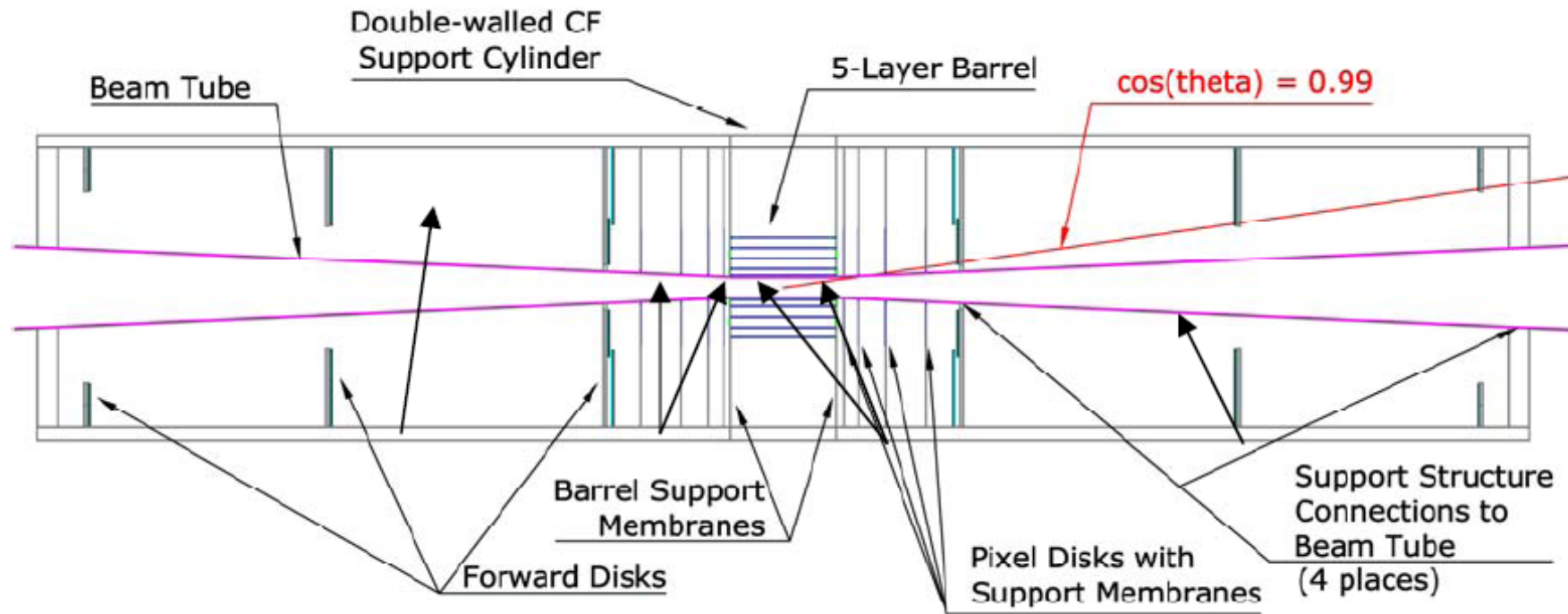


SiD Open for Access to the VXD Region





VXD and Support Structures





Elevation & Plan Views of Far-Lumi/BeamCal

