

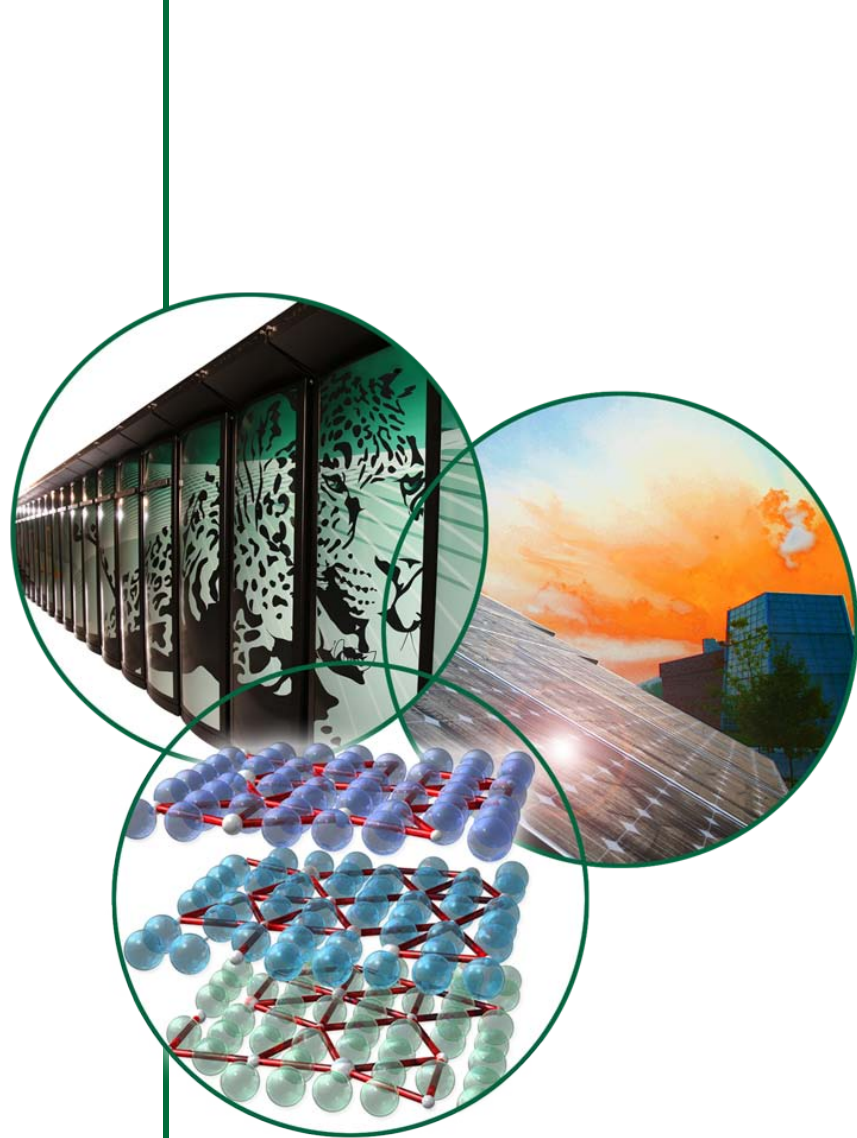
The HYSPEC Polarized Beam Spectrometer

Mark Hagen, Barry Winn,
Melissa Graves-Brook

Neutron Scattering Science Division

David Anderson, Xin Tony Tong

*Neutron Facilities Development
Division*



HYSPEC People

At Oak Ridge Nat. Lab.

Instrument team:

Mark Hagen

Barry Winn

Melissa Graves-Brook

Lead Engineer:

David Anderson

^3He Polarization:

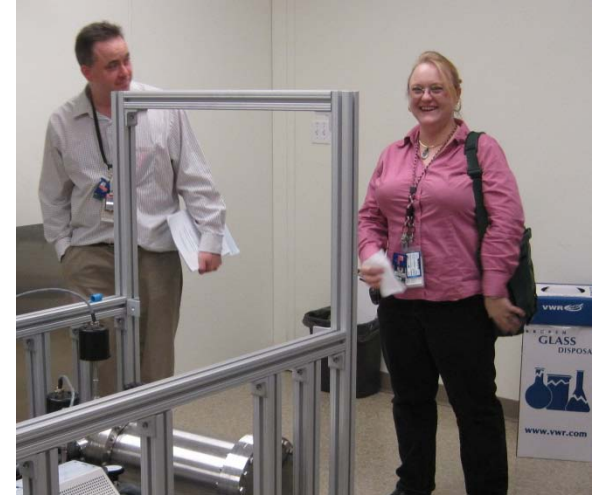
Xin "Tony" Tong

Nick Thomas

Daniel Brown



Mark Hagen Barry Winn Tony Tong David Anderson



Melissa Graves-Brook

At Brookhaven Nat. Lab.

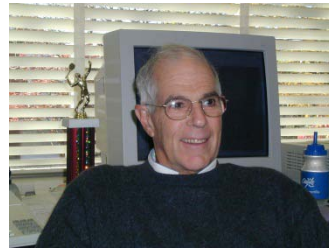
Principal Investigators:

Steve Shapiro

Igor Zaliznyak

Lead Engineer:

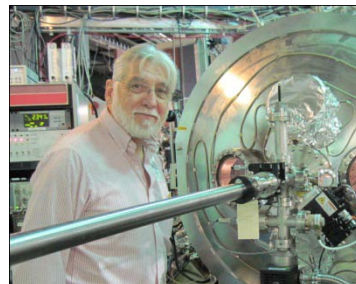
Bill Leonhardt



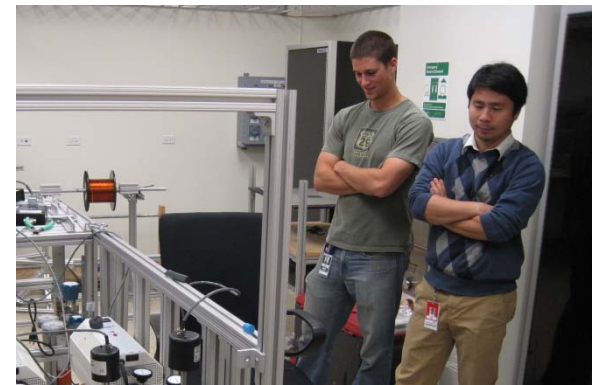
Steve Shapiro



Igor Zaliznyak



Bill Leonhardt



Nick Thomas


Outline

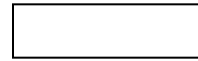
- What you've seen
- What's Hidden
- What's Coming
- What's Next

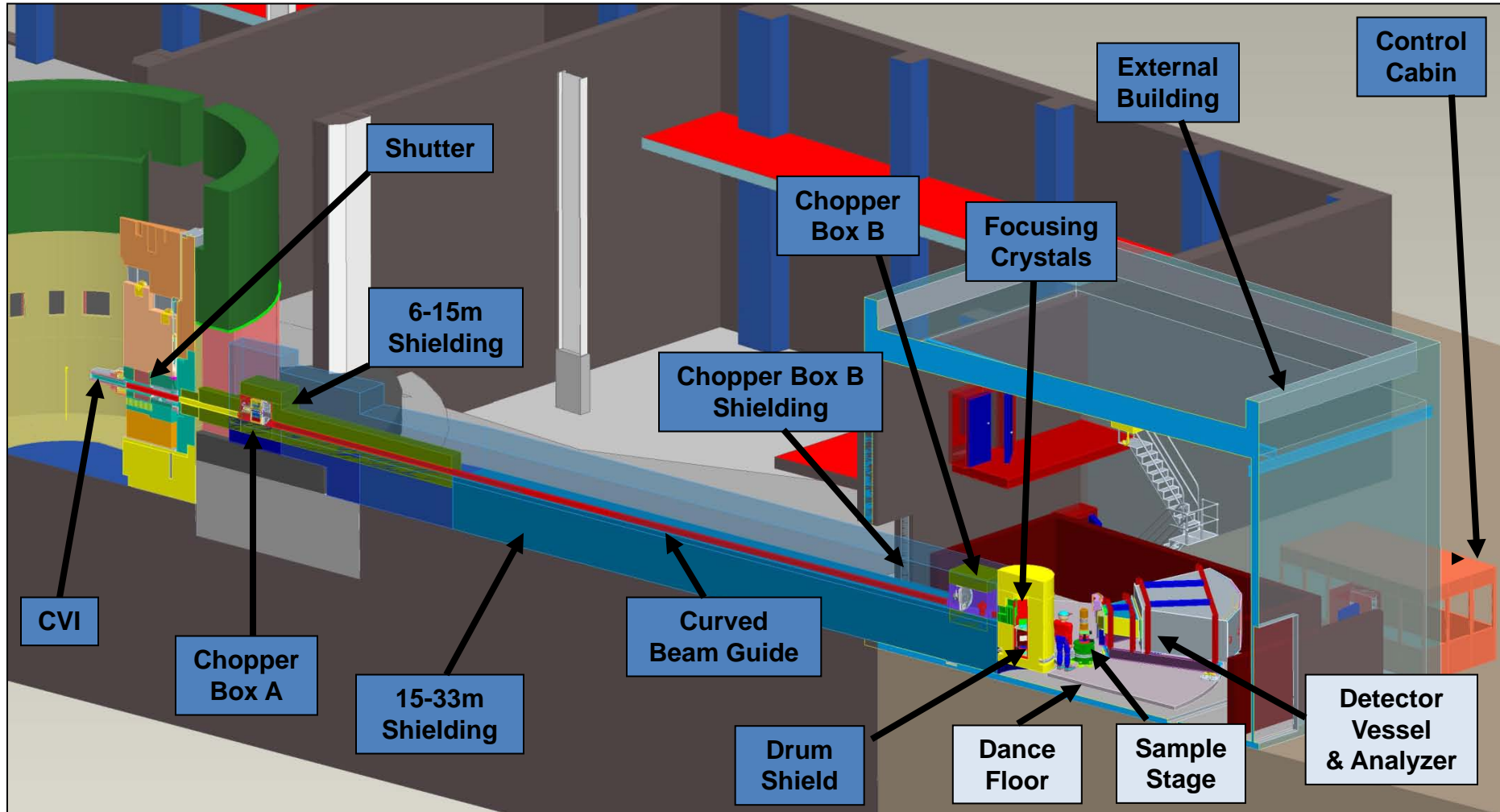
Instrument Overview

 Installed/Installing

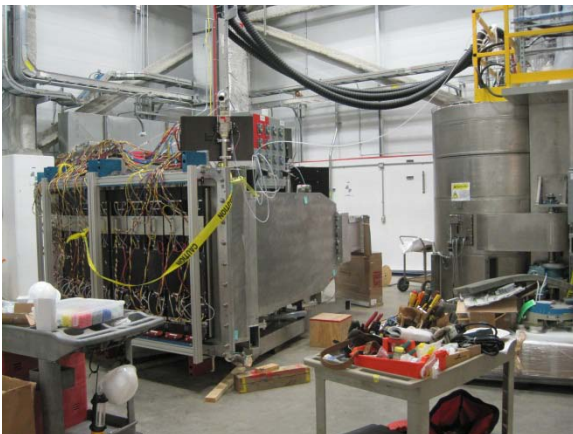
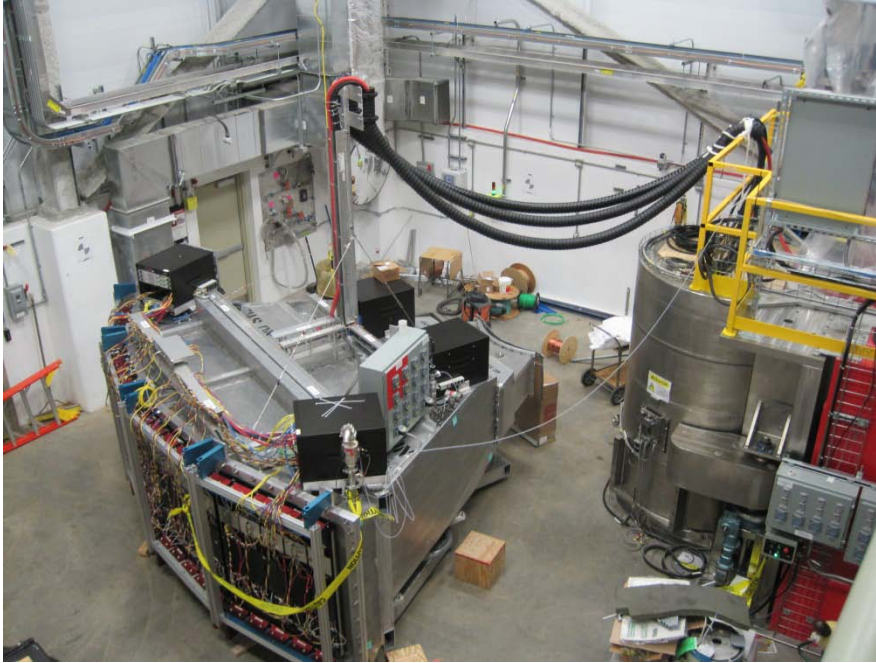
 Designed

 In fabrication

 In design



What You've Just Seen...



What's Hidden...

Choppers, Monitors, Shutters, Guides, Cables, Pipes & Socks



Magnetic Guide Field in Drum Shield Exit Port

- To preserve polarization of neutrons from Heusler
- NdFeB magnets on the sides, steel top & bottom
- Both drum shield (shown) and tertiary shutter
- Inner lining: Maxus boron loaded aluminum
- 480 Gauss at entrance, 7 Gauss 30 cm away



Cadmium Shielding inside Detector Vessel

- 1.5 mm thick cadmium



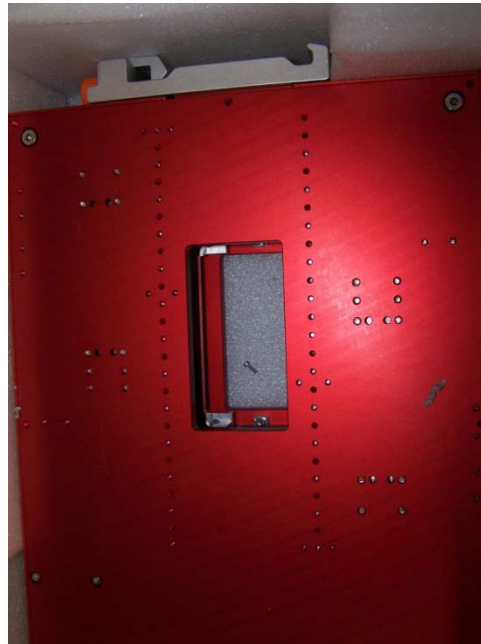
Neutron Monitor #3

- Calibrated at HFIR, so under radioactive material control
- To be mounted on optical rail outside drum shield



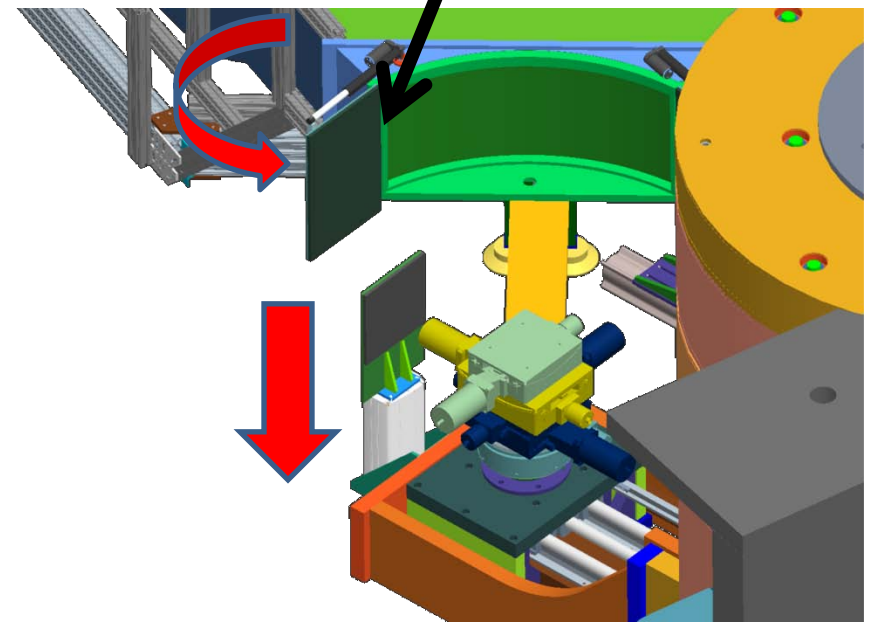
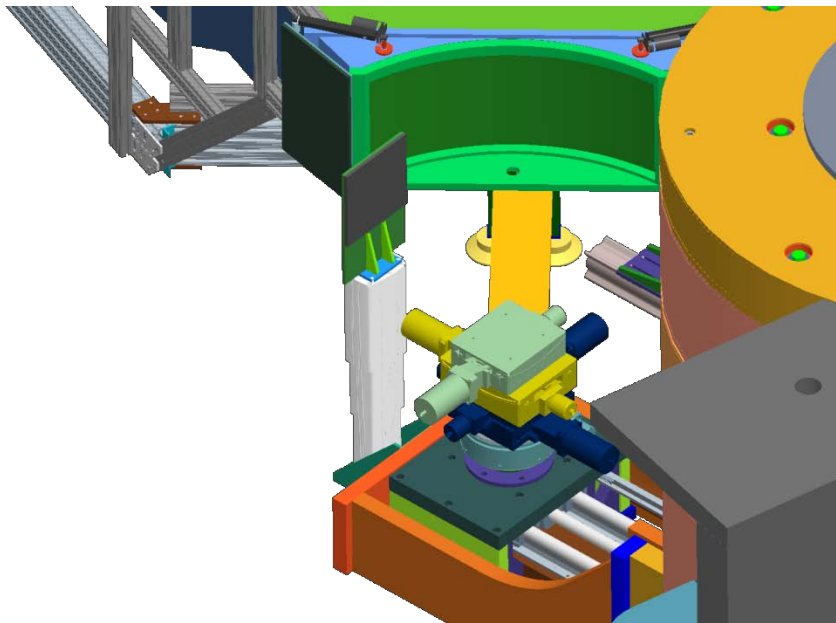
Apertures

- Absorber blades: CBBC with BN paint, to be installed
- Have two



Flapping Ears

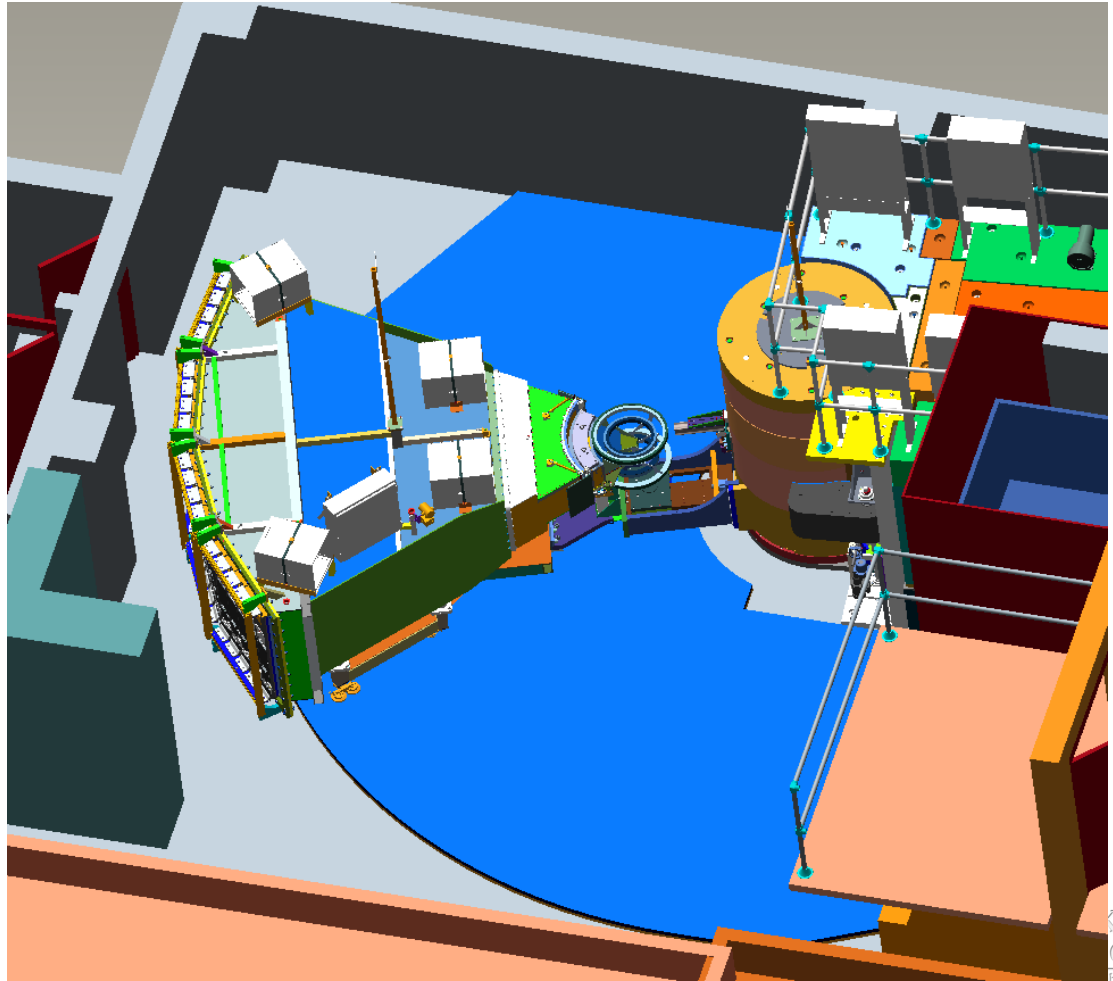
- CBBC panels with BN paint ready to attach



What's Coming...

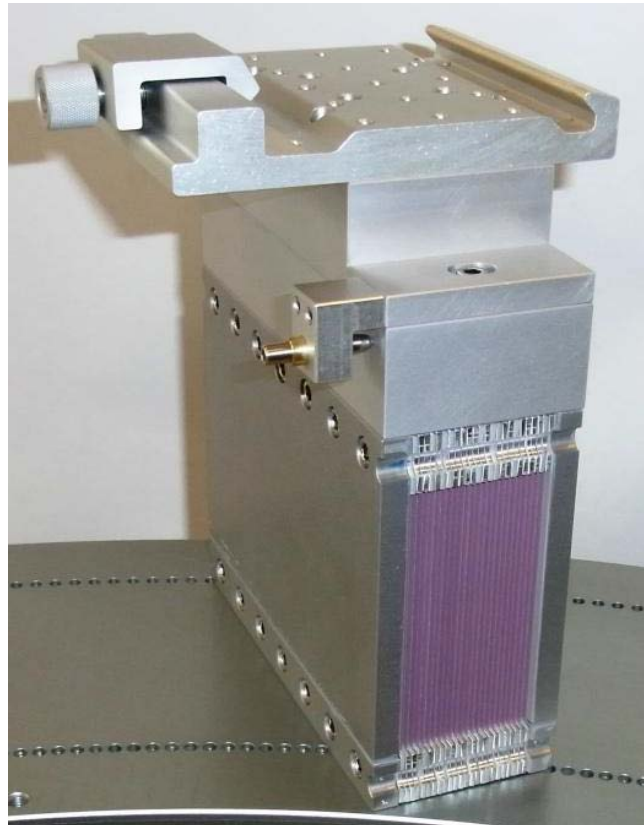
Tanzboden

- Granite tiles in US
- Installers arrive next week
- Air pads here, too



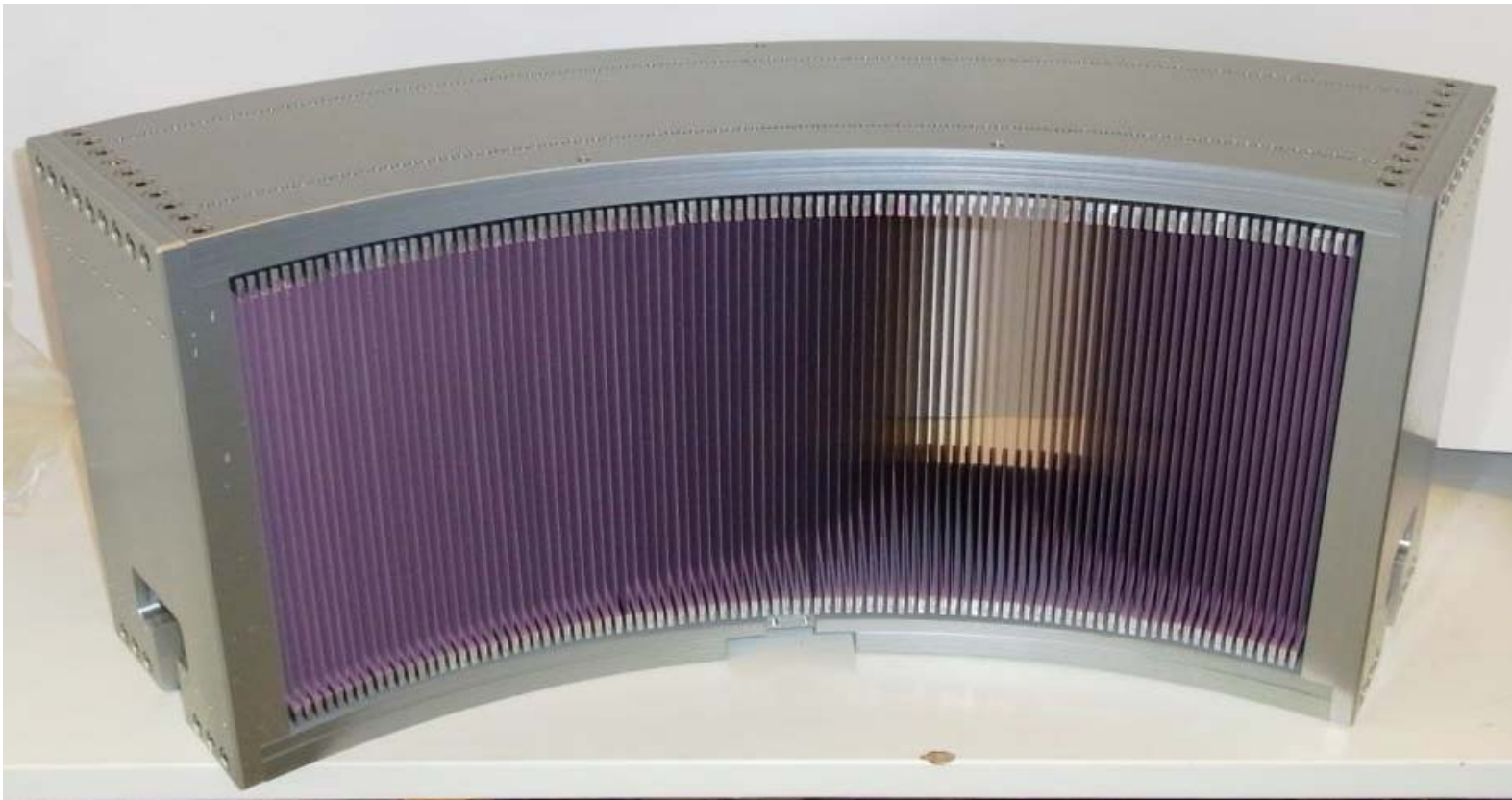
Soeller Collimators

- Both 20' & 40'
- JJ-Xray design through assembly
- Dimensional Inspection Reports imminent



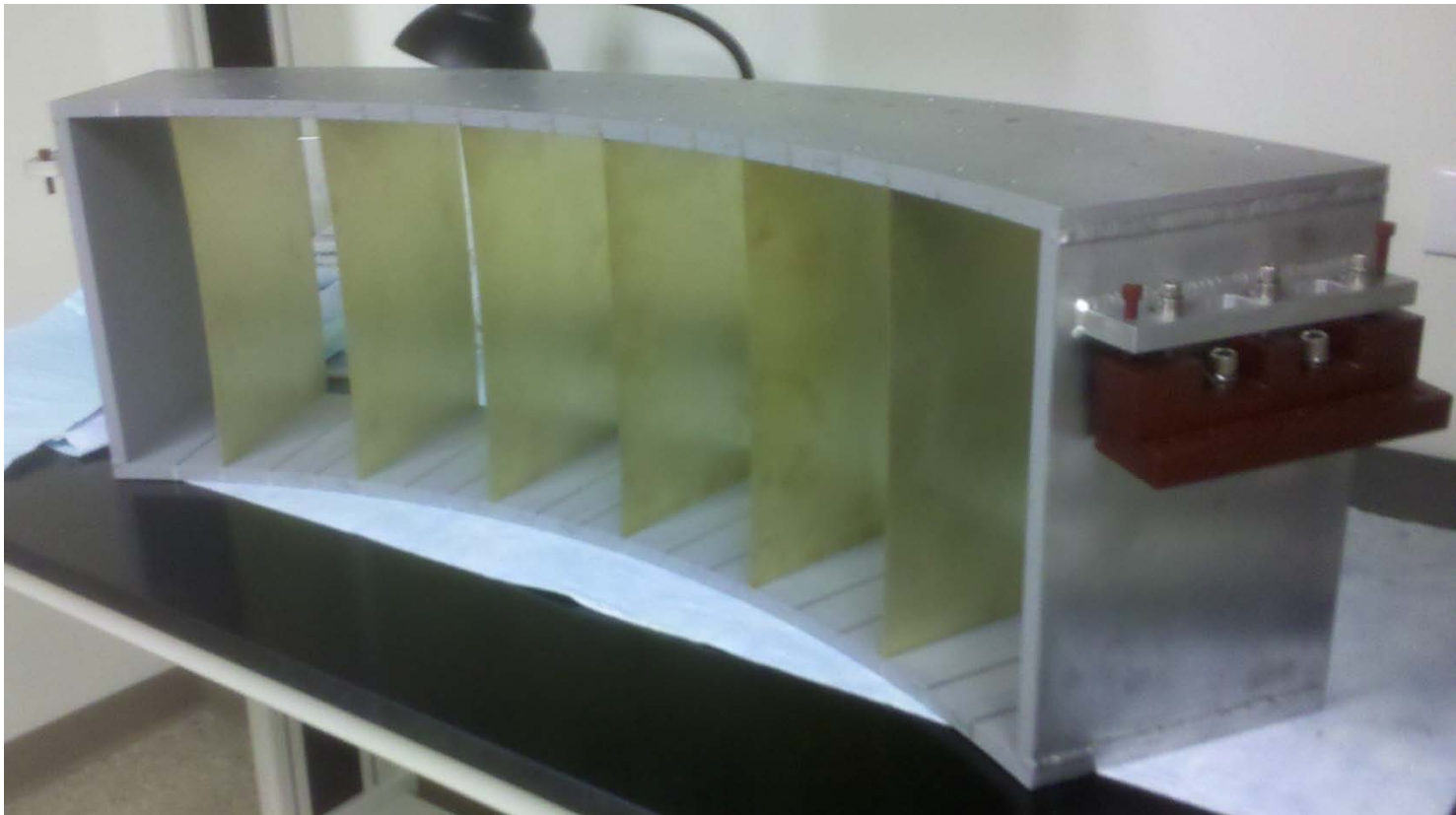
Fine Radial Collimator

- Pane angle spacing: 40'
- JJ-Xray design through assembly
- Dimensional Inspection Reports imminent



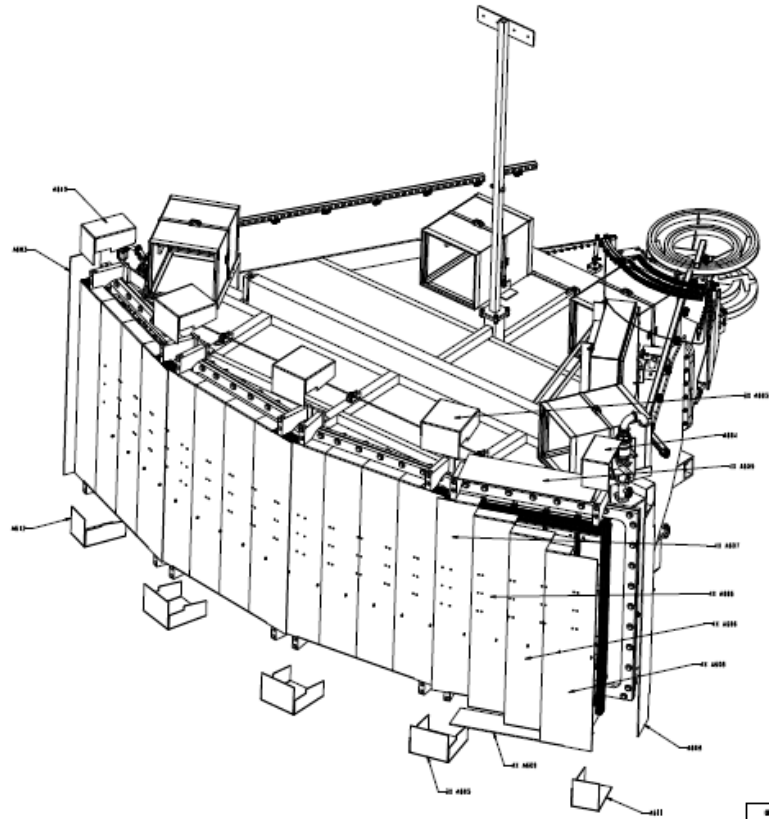
Coarse Radial Collimator

- Frame assembled by ORT-E
- On-Site
- Cd coated blade installation awaiting final installation



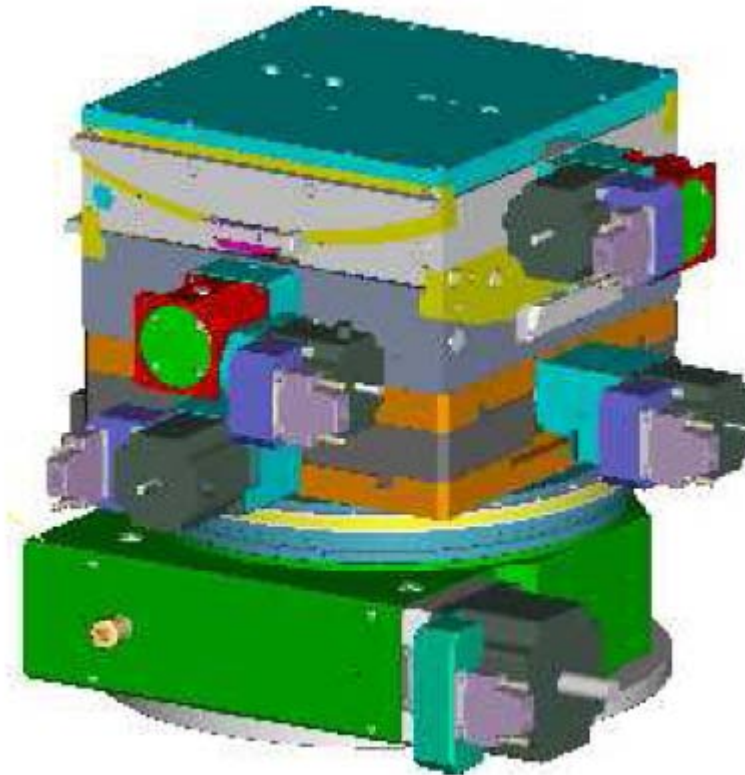
Cadmium shielding at back

- In addition to ½" thick CBBC panels behind tubes on 8-packs
- Cadmium thickness 1.5 mm
- Not shown: Cadmium sheet between 8-packs



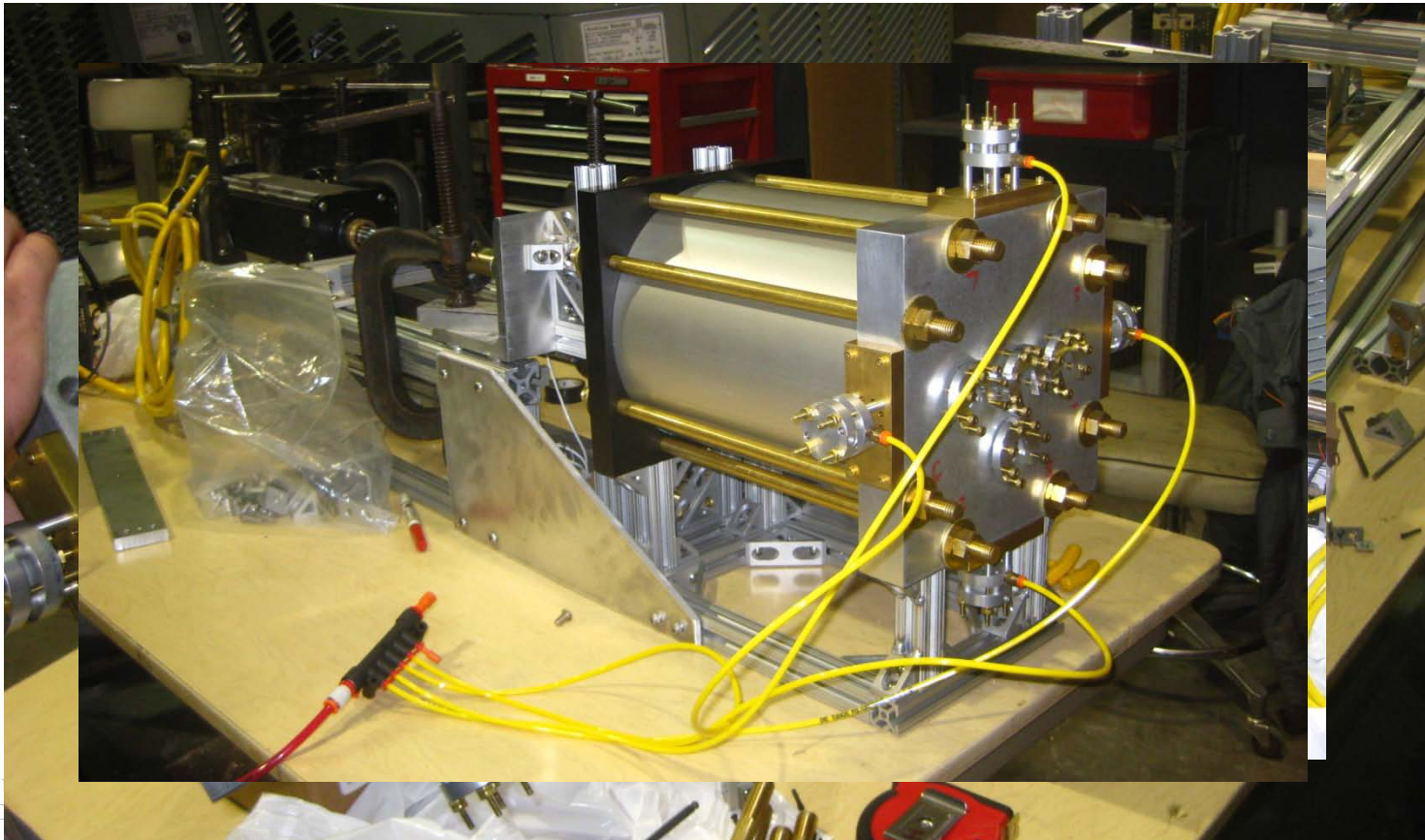
Sample rotation, tilt and translation

- Huber: final design through assembly



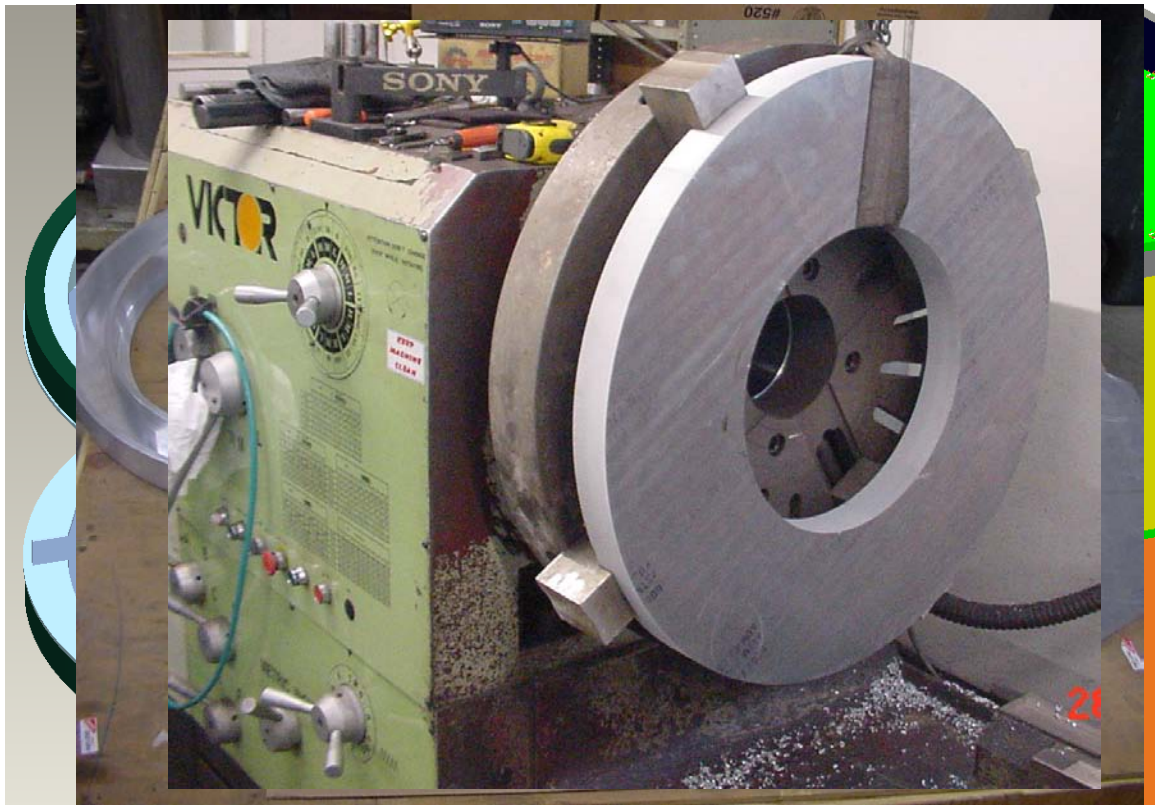
Polarized 3-He Transfer Mechanism

- Basic Design: Nick Thomas
- Final Design & Fabrication: Vacuum Technology International, Oak Ridge
- Assembly & Testing now: Nick Thomas & Dan Brown



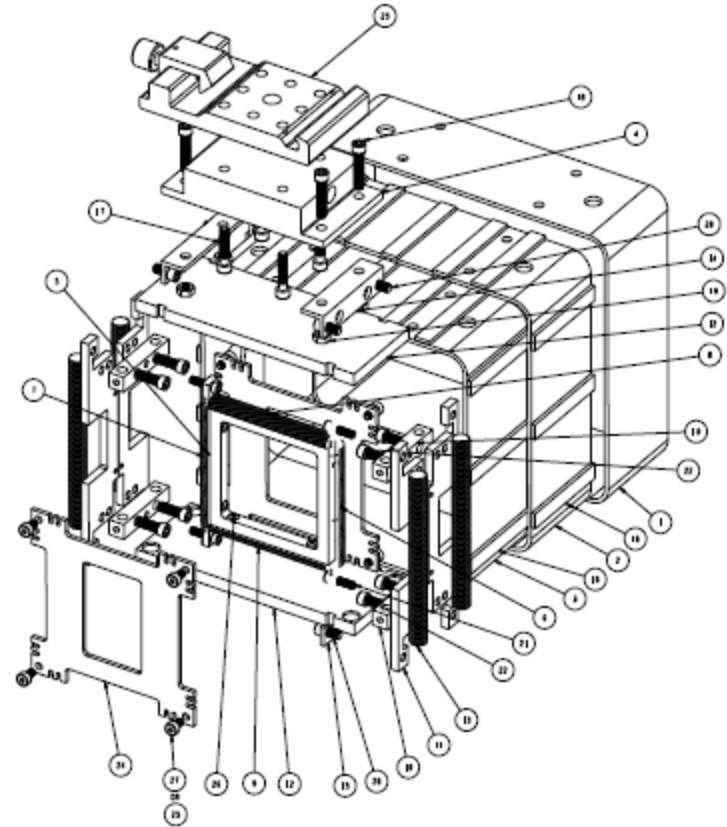
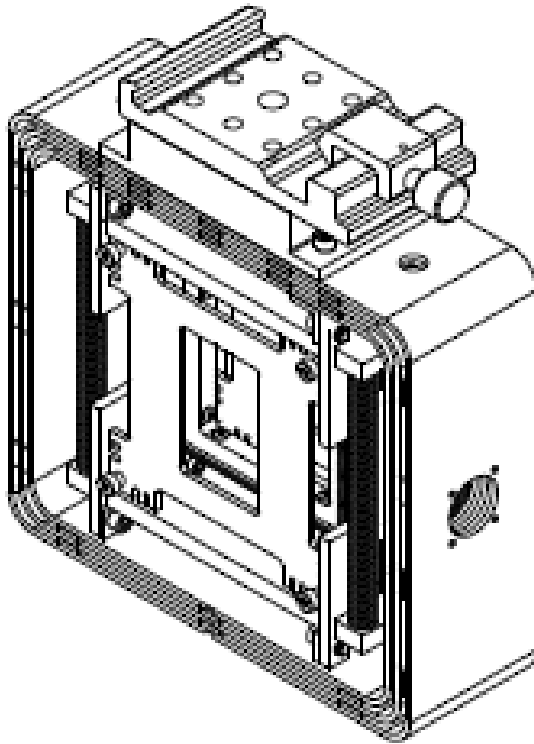
Helmholtz-Like Coil

- Technicoil: Final Design through Assembly
- Currently in Fabrication



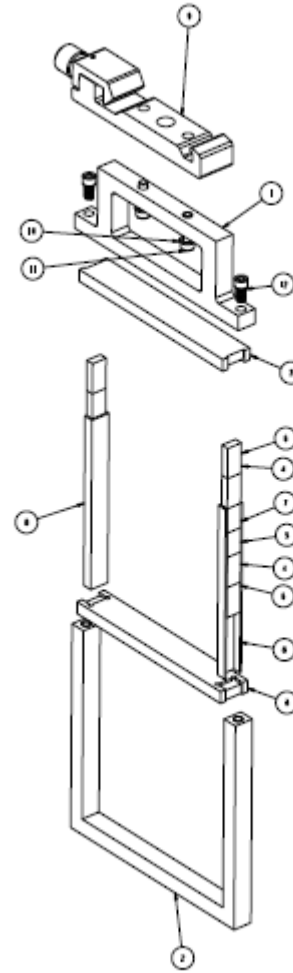
Mezei Flipper

- 1.5 cm gap, 1 mm diameter Al wire
- Fabricated parts arrive April 28



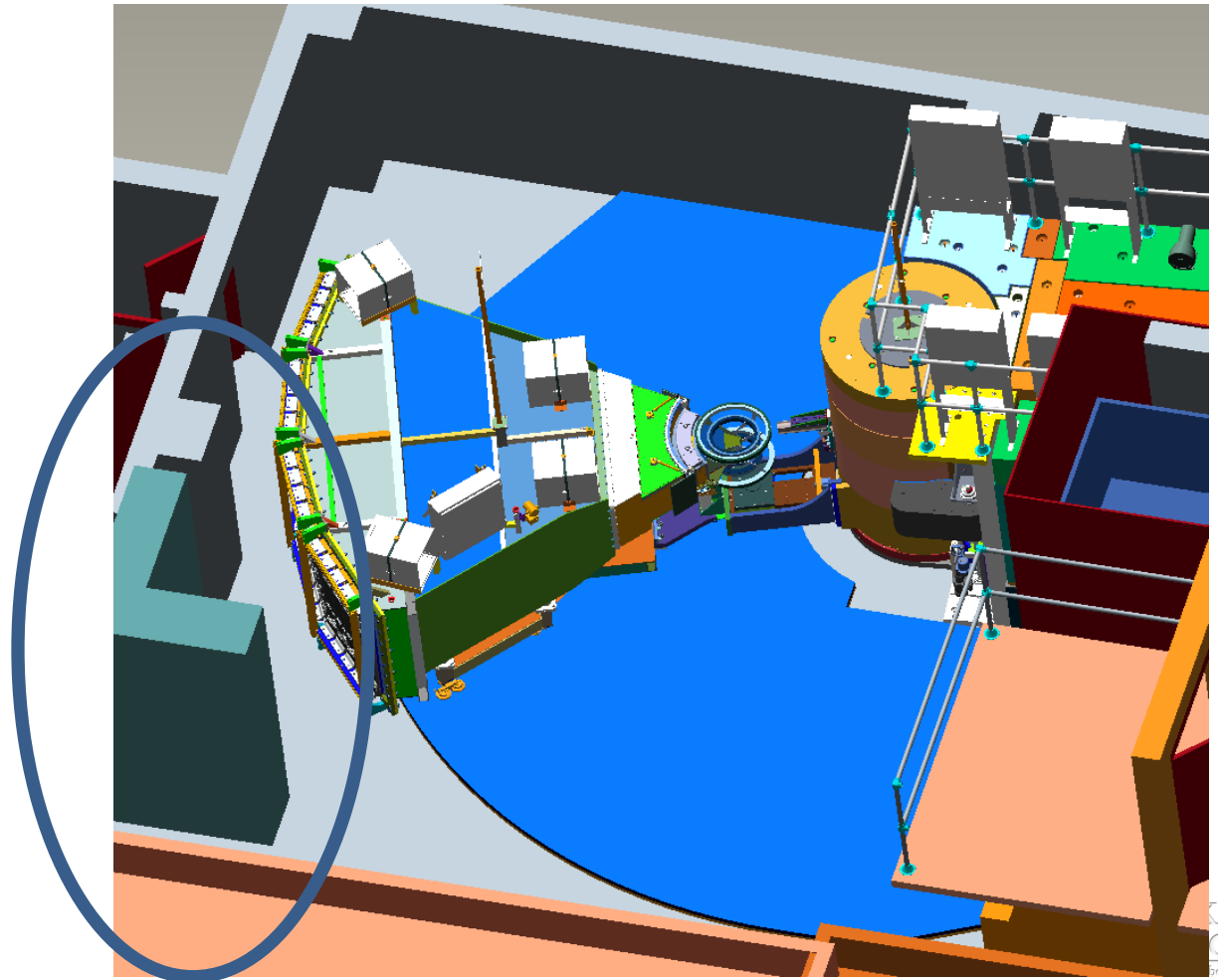
Guide Field, rail mount

- NdFeB magnets and steel
- Parts arrive at ORNL April 28

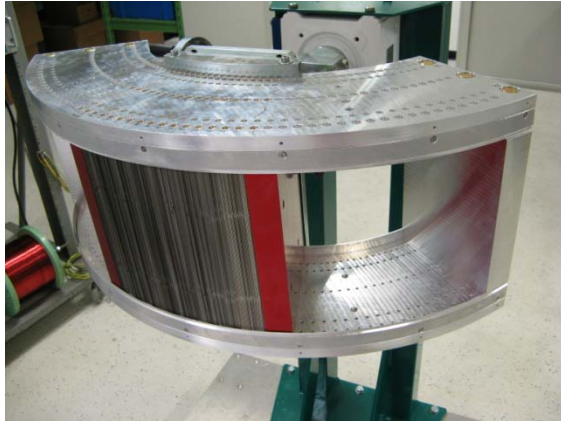


'L' Shield at rolling door

- Yellow Temporary Blocks currently in target building
- Enables transport of largest sample environments



Supermirror Polarization Analyzer



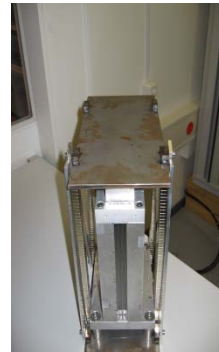
Supermirror analyzer assembled with around 200 supermirrors



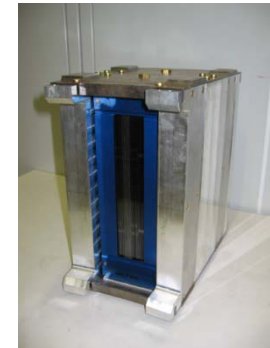
supermirror analyzer inside the magnetisation unit (500 G)

Current Status:

- 780 out of 960 polarizers produced so far
- ~100 polarizers per month
- 200 polarizers installed in housing & tested on BOA (optics beamline at SINQ, PSI)
- Anticipated completion in ~March 2011, followed by tests at SINQ

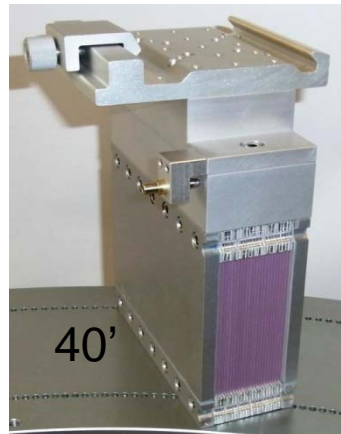
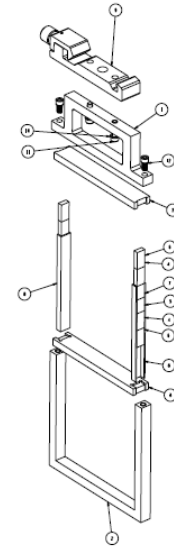
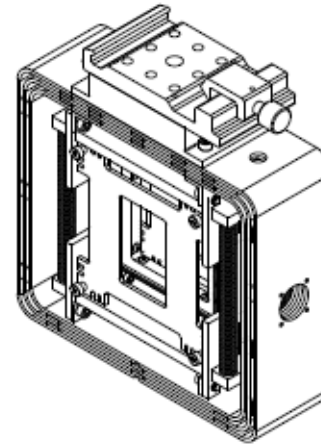
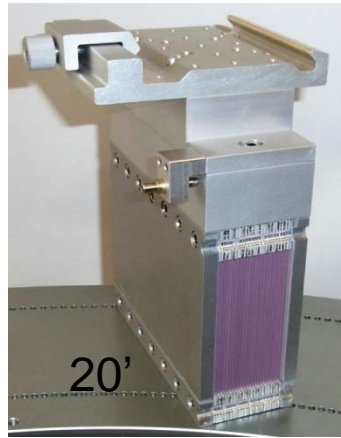


Prototype I (1.8 deg)



Prototype II (4.0 deg)

Optical Rail Components



What's Next: Schedule

- Construction complete in June 2011
- Motion and Integrated testing in June 2011
- IRR in Summer 2011
- Neutrons in August 2011
- Unpolarized commissioning through 2011
- Polarized commissioning in 2012A

IDT Experiments

- During commissioning
 - HYSPEC's Extended Commissioning Plan (plan to demonstrate science-readiness) requires an experiment by reviewers
 - Whose results may have high scientific impact
 - Which exploits either the unique or the improved capabilities of HYSPEC
- During operations