

ProtoDUNE-SP Geometry Update

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What is ProtoDUNE-SP Geometry v3?

- December 2016
- Correct dimension for the steel support implemented as 62 cm of steel-air mixture
- Correct dimension for the foam insulation implemented as 80 cm of foam padding
- **(New)** Simple opening in the steel support and foam with 25 cm diameter for beam windows 2 and 3.
- **(New)** Correct location for both beam windows. In v2 beam window 2 was not in the correct location.
- **(New)** Simple cosmic ray tracker volumes without segmentation. The size is the same as the size of the modules presented by Ed at the Sept collaboration meeting.

Changes to the Cryostat and TPC

- Correct inner dimensions of the cryostat, correct layer of argon on all sides of the TPC. TPC sits off-center in the cryostat as it should.
- Correct depth of the gaseous argon.
- Latest wire angles, APA and, CPA dimensions.
- **(New)** Beam plug for beam window 3 implemented as a G10 pipe with 25 cm outer diameter and 2.5 cm wall filled with Ni Gas at 1 atm. The beam plug reaches (almost) the active volume of the TPC.
- Used for MCC9

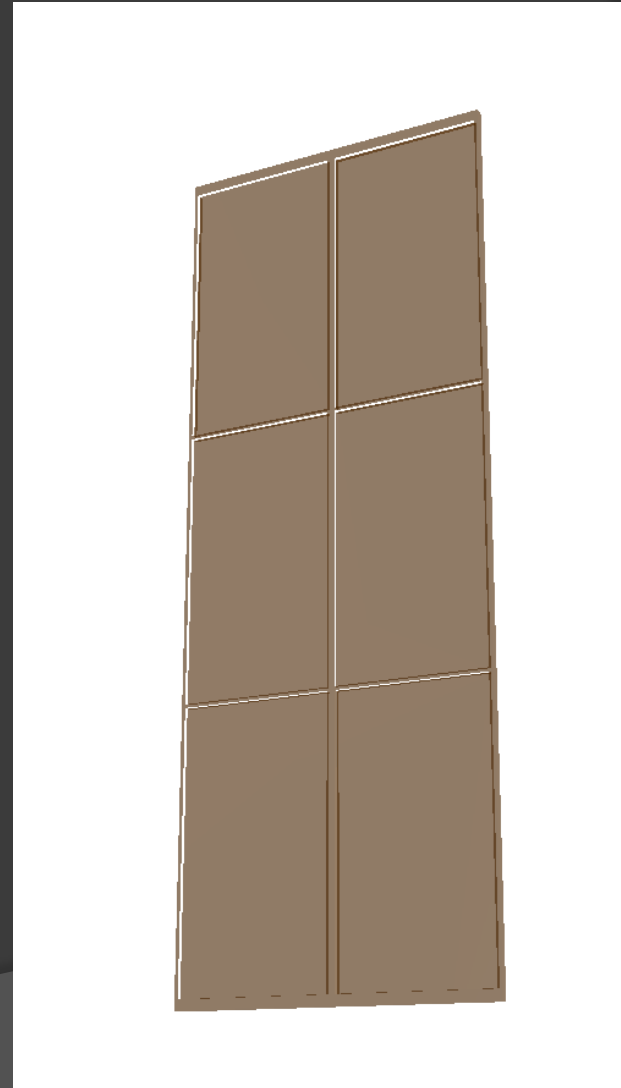
Plans for ProtoDUNE-SP Geometry v4

- Finalizing field cage
- Detail of the support structure
- CRT segmentation
- Update beam window – steel ribs of beam plug and correct foam implementation.
- Implement detailed geometry for existing elements

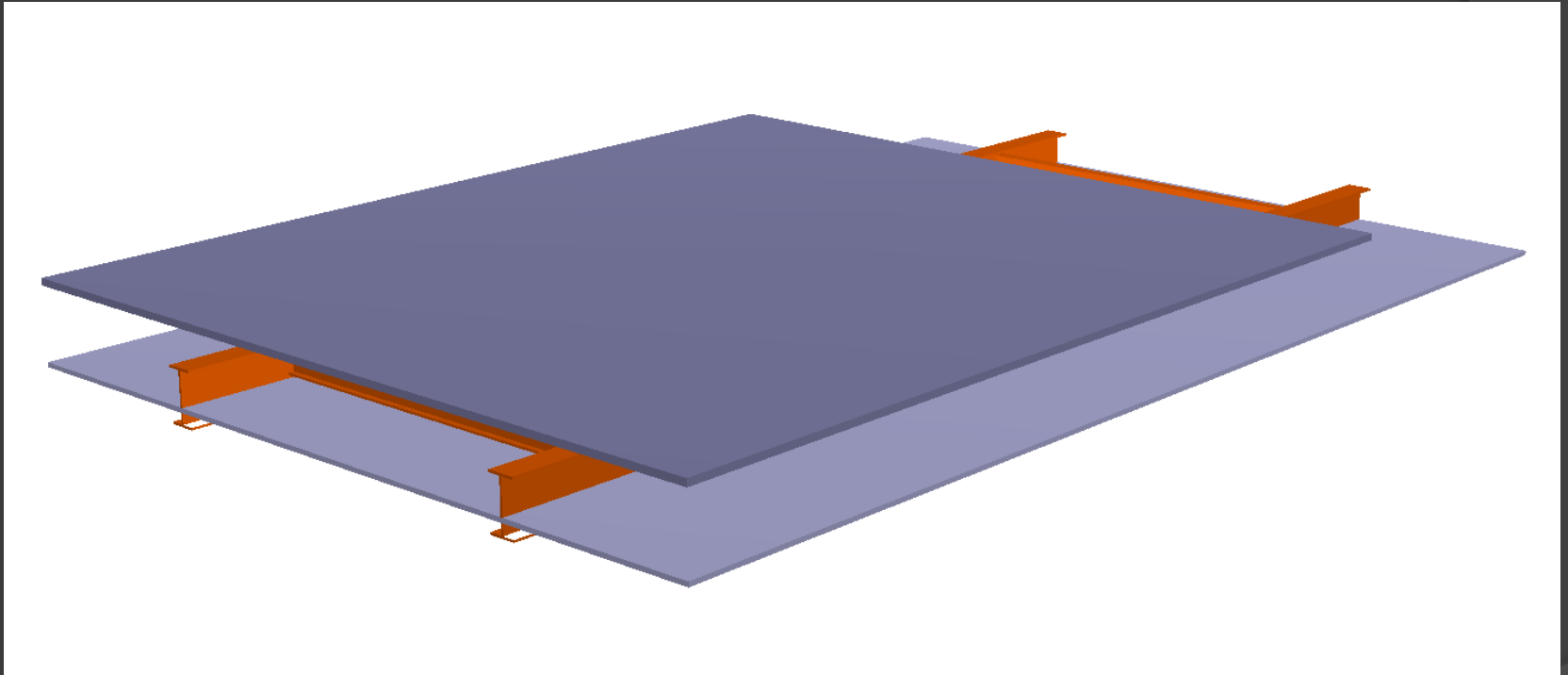
ProtoDUNE-SP Geometry v4 – CPA

Each TPC has 6 modules

- G10
- Proper side G10 frame



ProtoDUNE-SP Geometry v4 – Field Cage Top/Bottom



Steel shield plate

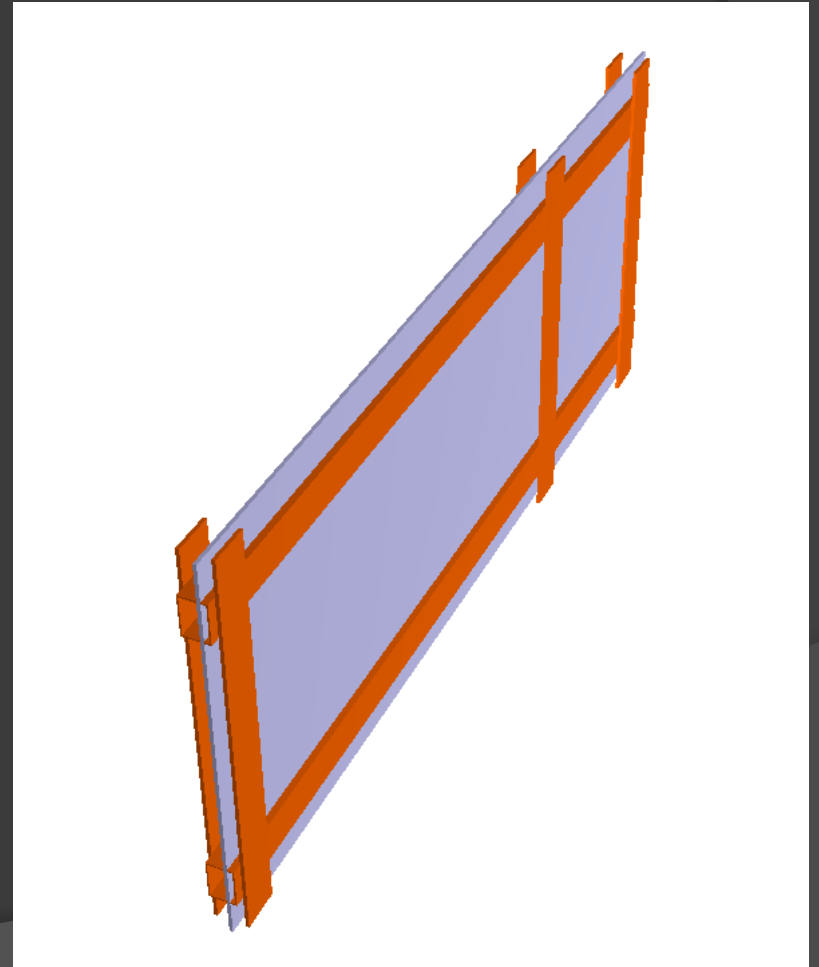
FR frame

Al plane representing the
C-profiles – same material

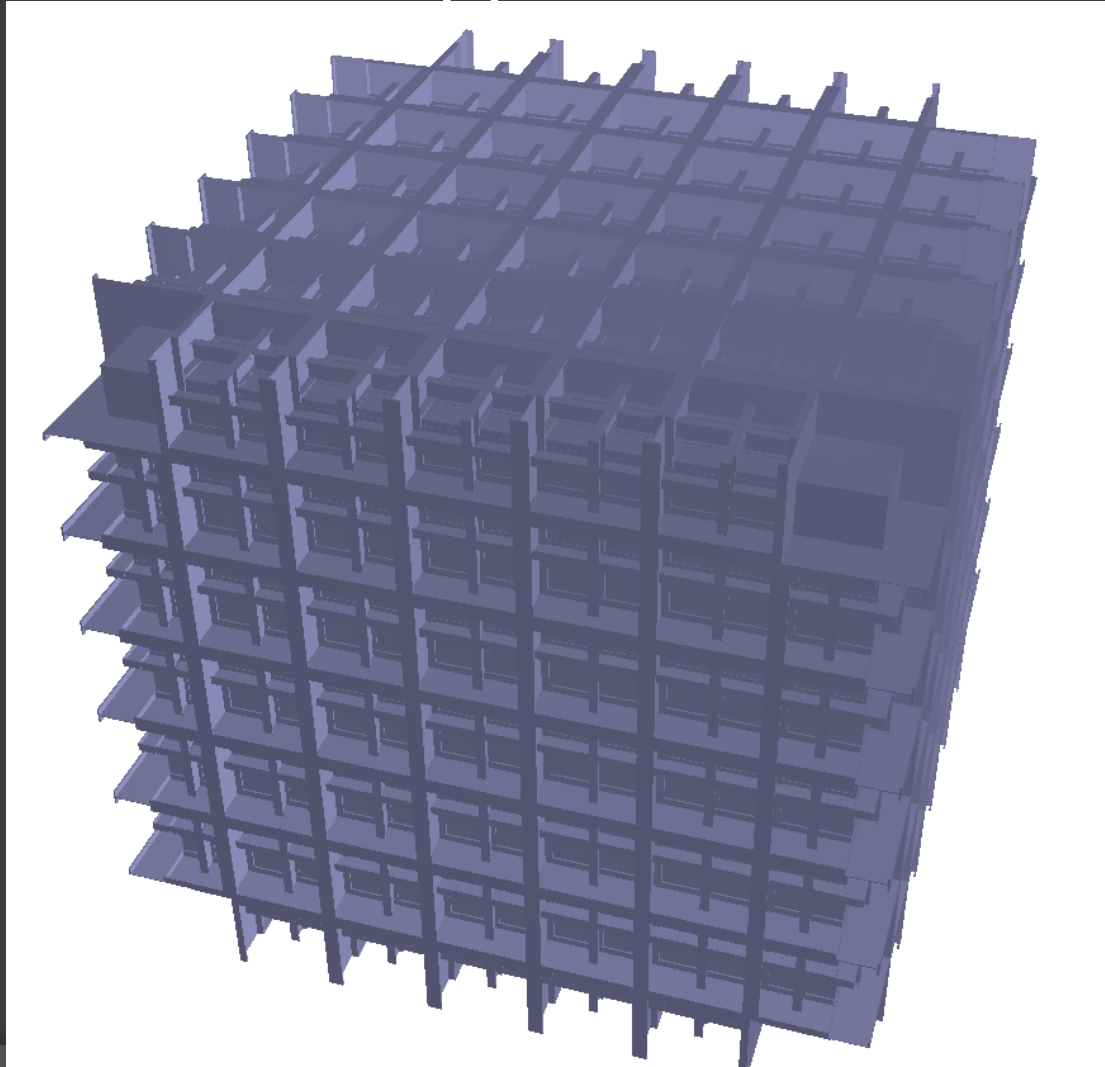
ProtoDUNE-SP Geometry v4 – Field Cage End Wall

FR frame

Al plane representing the
C-profiles – same material



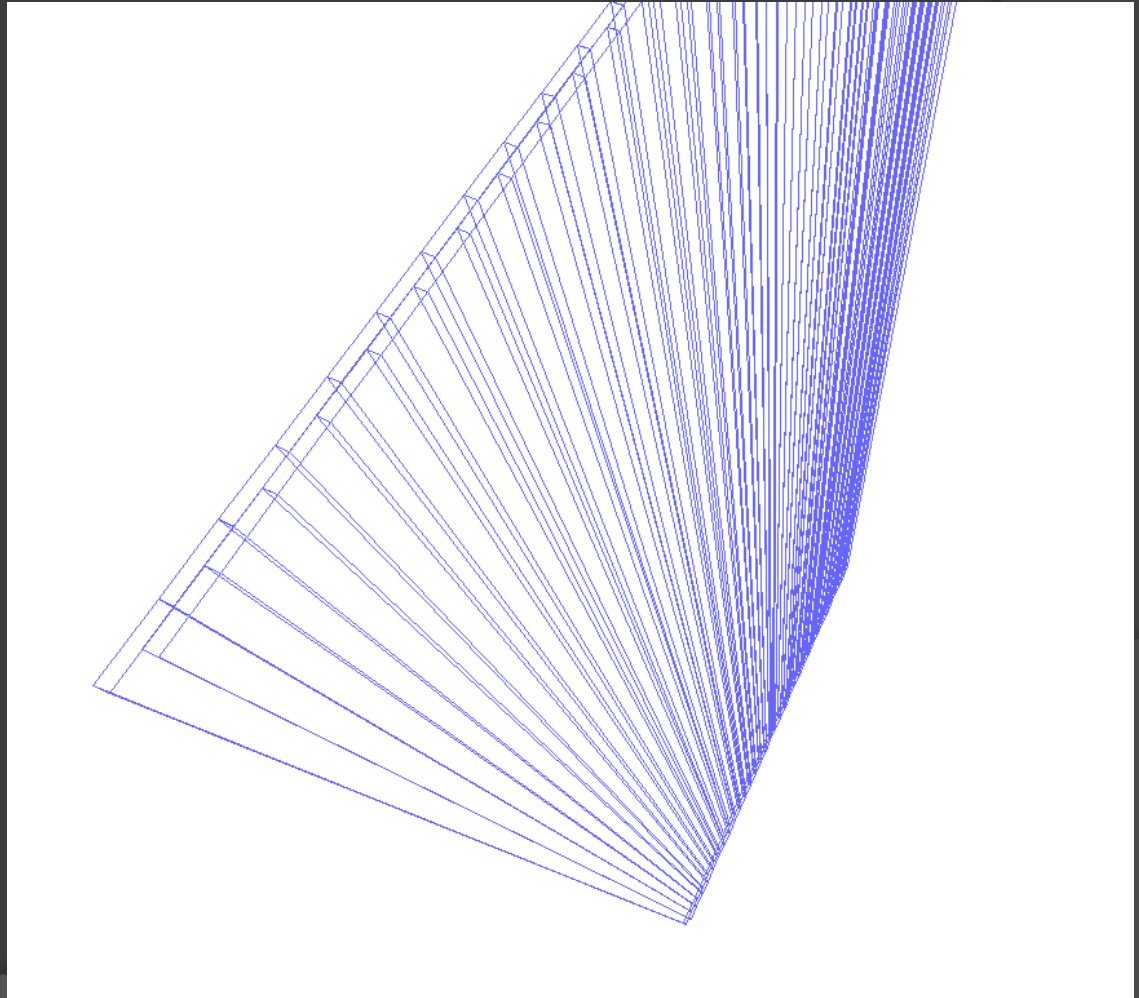
ProtoDUNE-SP Geometry v4 – Steel Support Structure



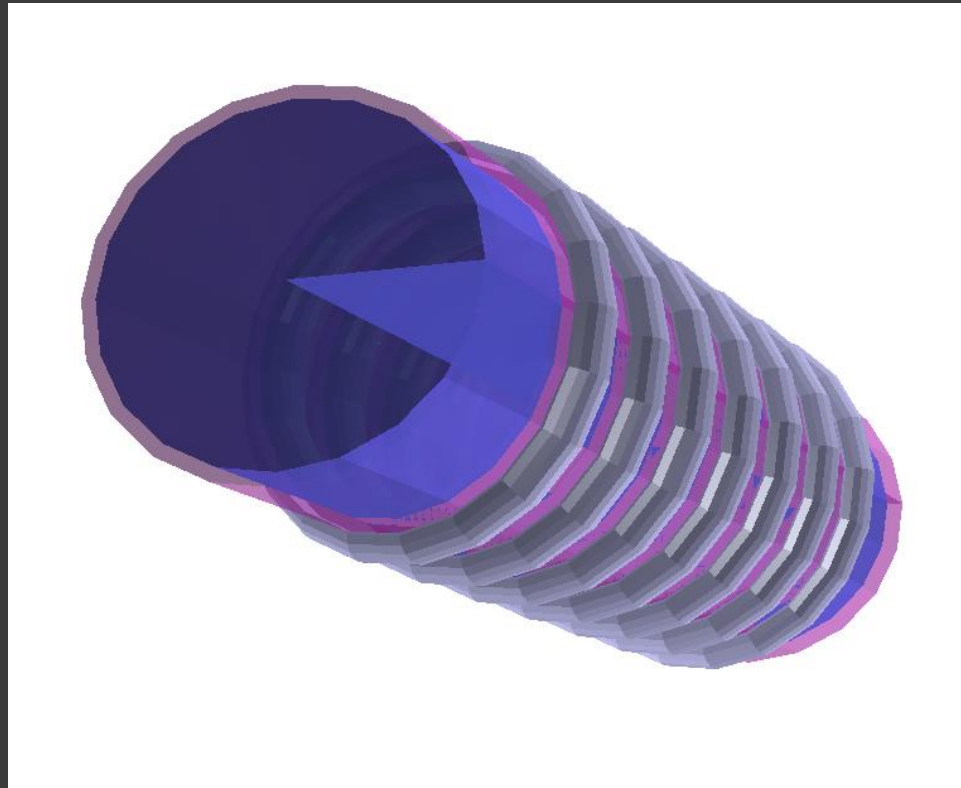
ProtoDUNE-SP Geometry v4 – CRT modules

Each module has 64
Paddles

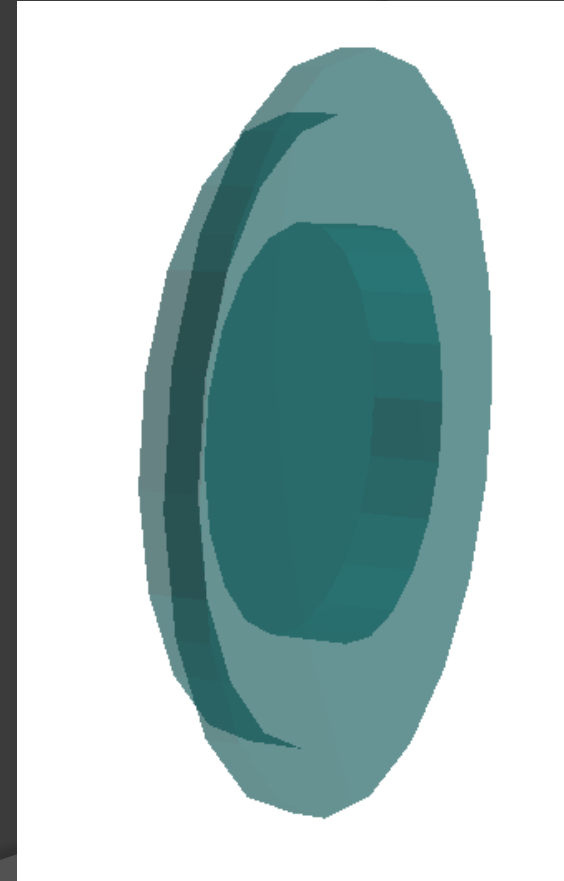
8 CRT modules.



ProtoDUNE-SP Geometry v4 – Beam Plug

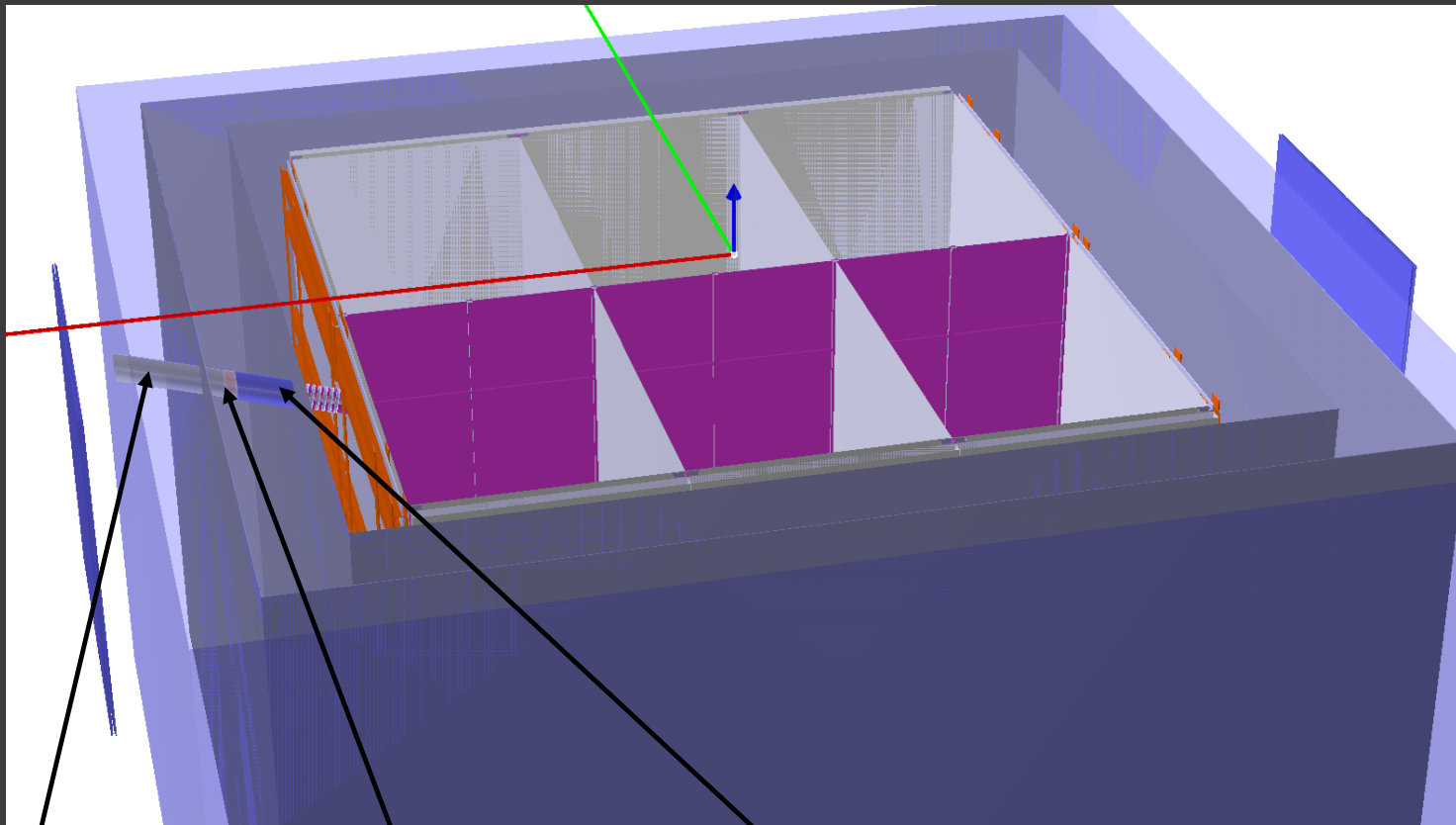


G10 tube with Ni gas at cryo temperature
Al contact rings



G10 flange

ProtoDUNE-SP Geometry v4 – Beam Window

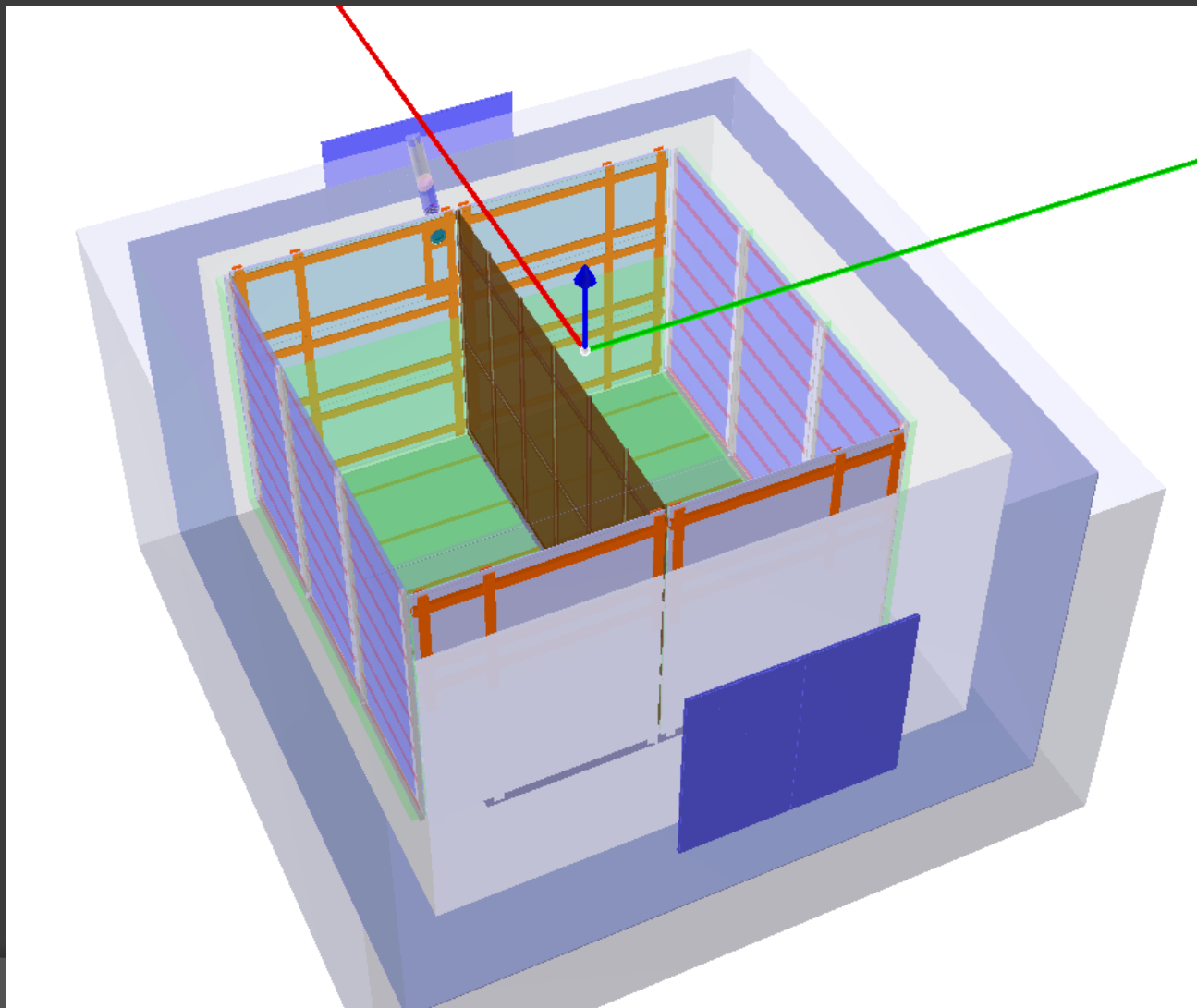


Steel tube
With vacuum

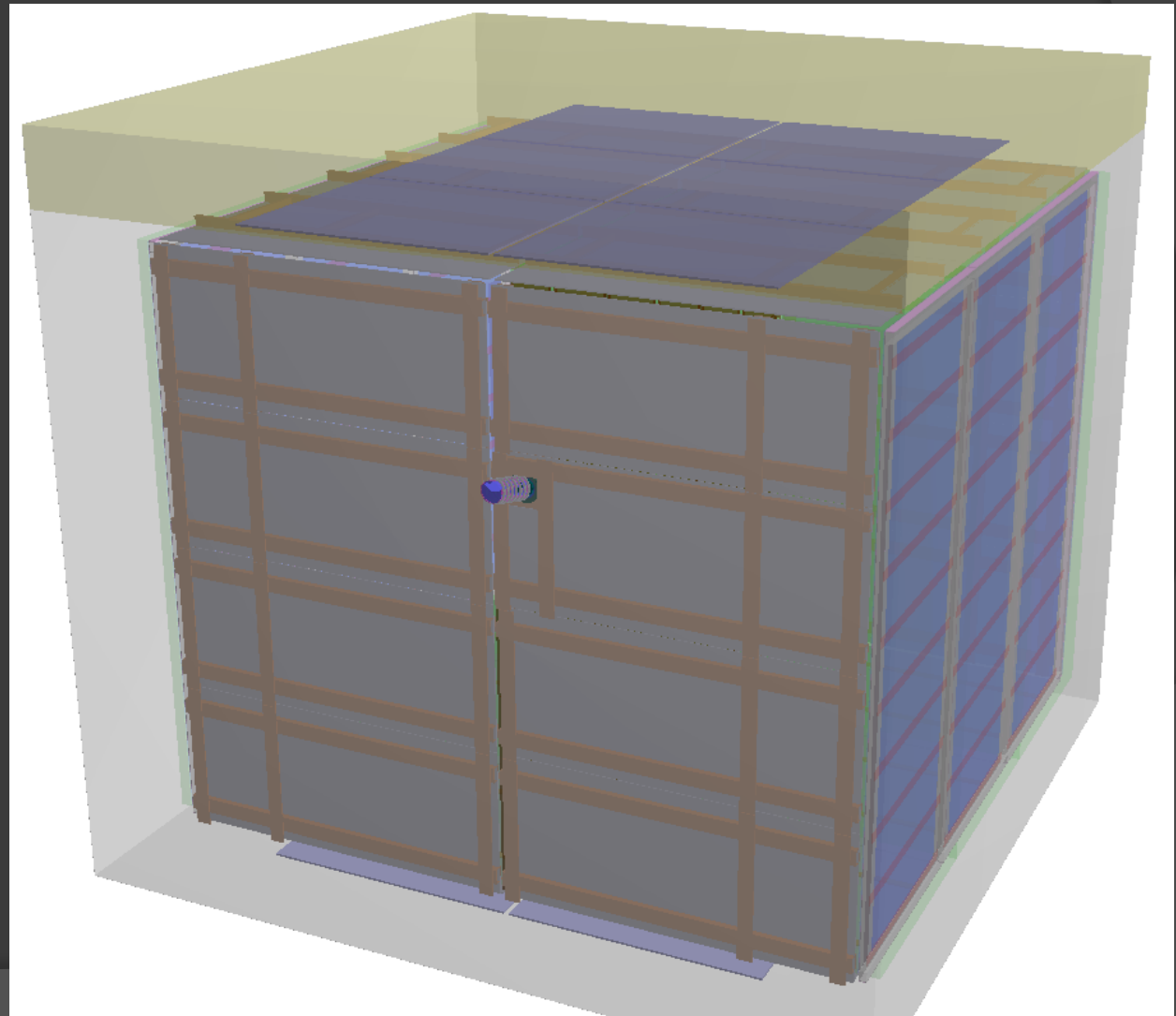
Glass wool

Lightweight Foam

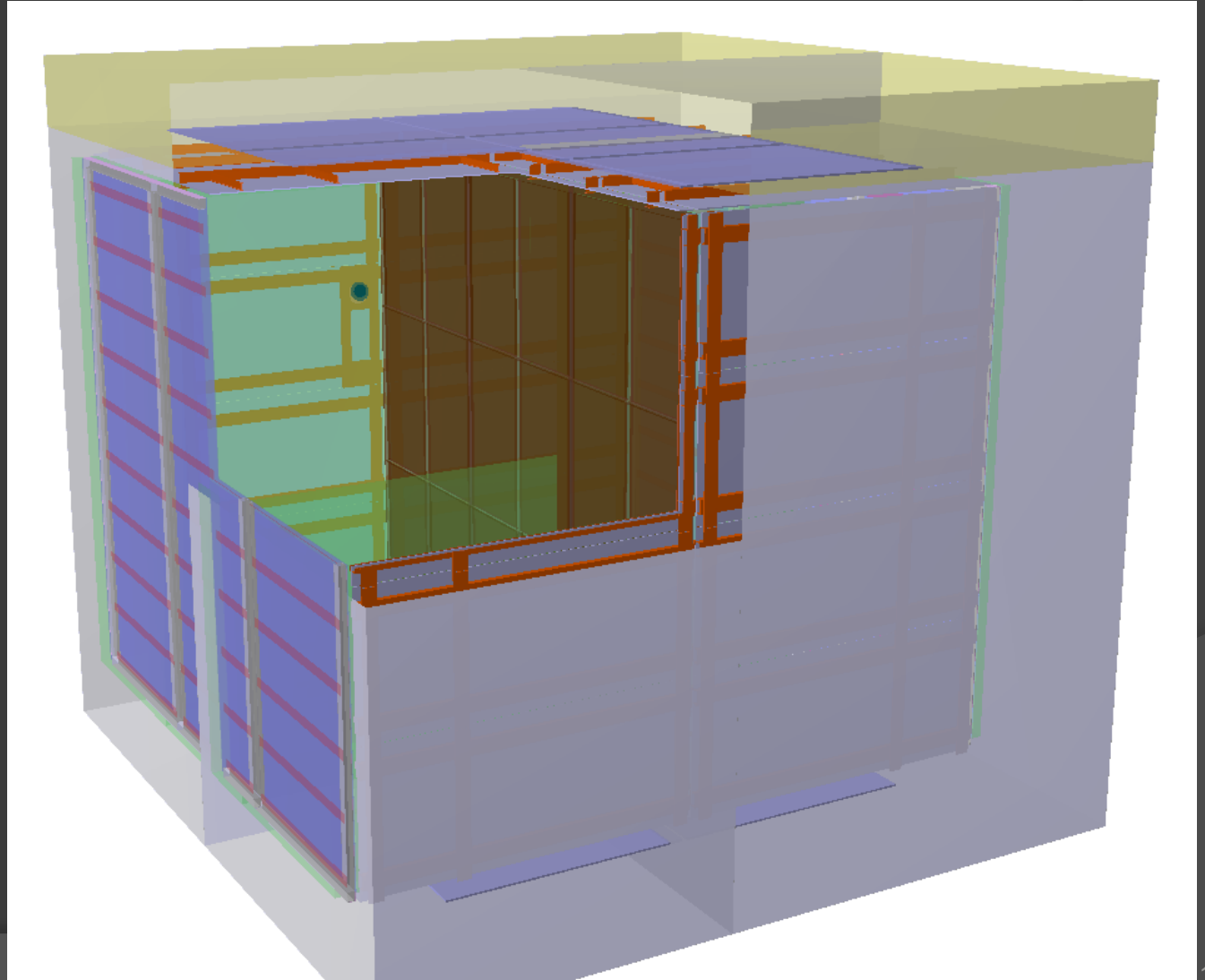
ProtoDUNE-SP Geometry v4 – Beam Window



ProtoDUNE-SP Geometry v4 – Cryostat



ProtoDUNE-SP Geometry v4 – Cryostat



ProtoDUNE-SP Geometry v4 Status

- Sufficient detail for all elements is already implemented.
- All materials properties and dimensions provided by engineers. Thanks to Dimitar and Jack.
- More detail can be added upon request.
- The next and possibly last version will scrutinize APA's geometry.