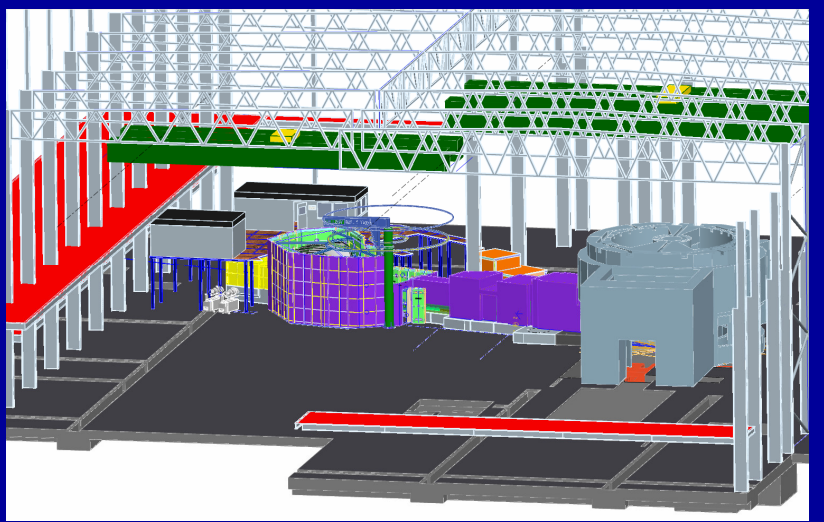
LET: a cold neutron chopper spectrometer on ISIS TS2



Project team:

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Scientific Advisory Committee:

Andrew Boothroyd
Roger Eccleston
Des McMorrow
Alan Tennant
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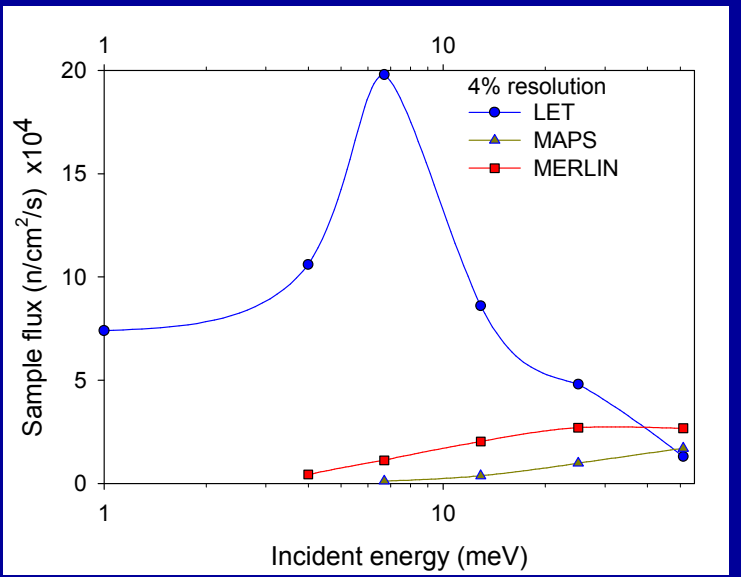
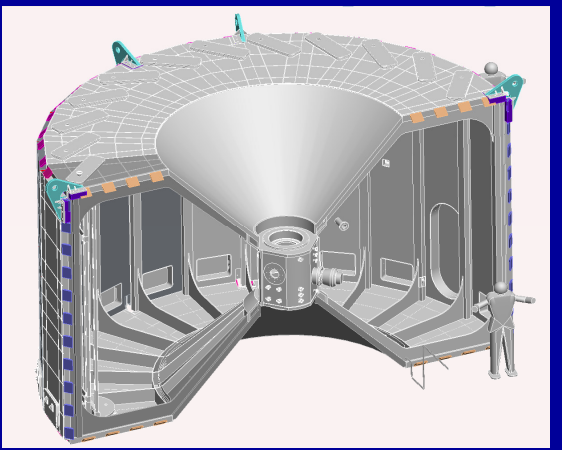
LET overview

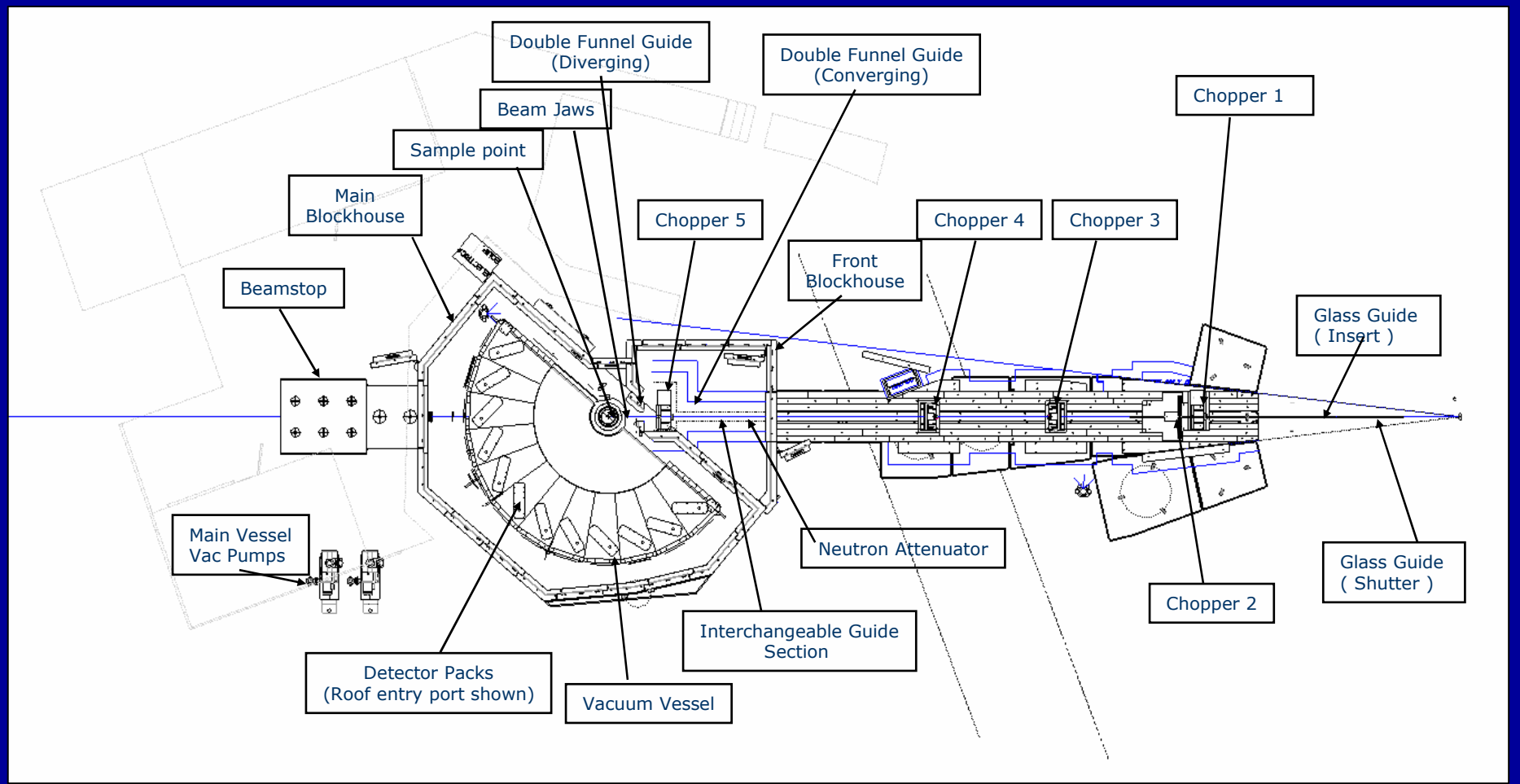
- High incident flux of cold neutrons
- Wide dynamic range
  (0.5 < E_i < 80 meV)
- Enormous position-sensitive detector:
  Horizontal –40 to +140 deg
  Vertical ±30 deg
- Highly flexible
- Polarization analysis option





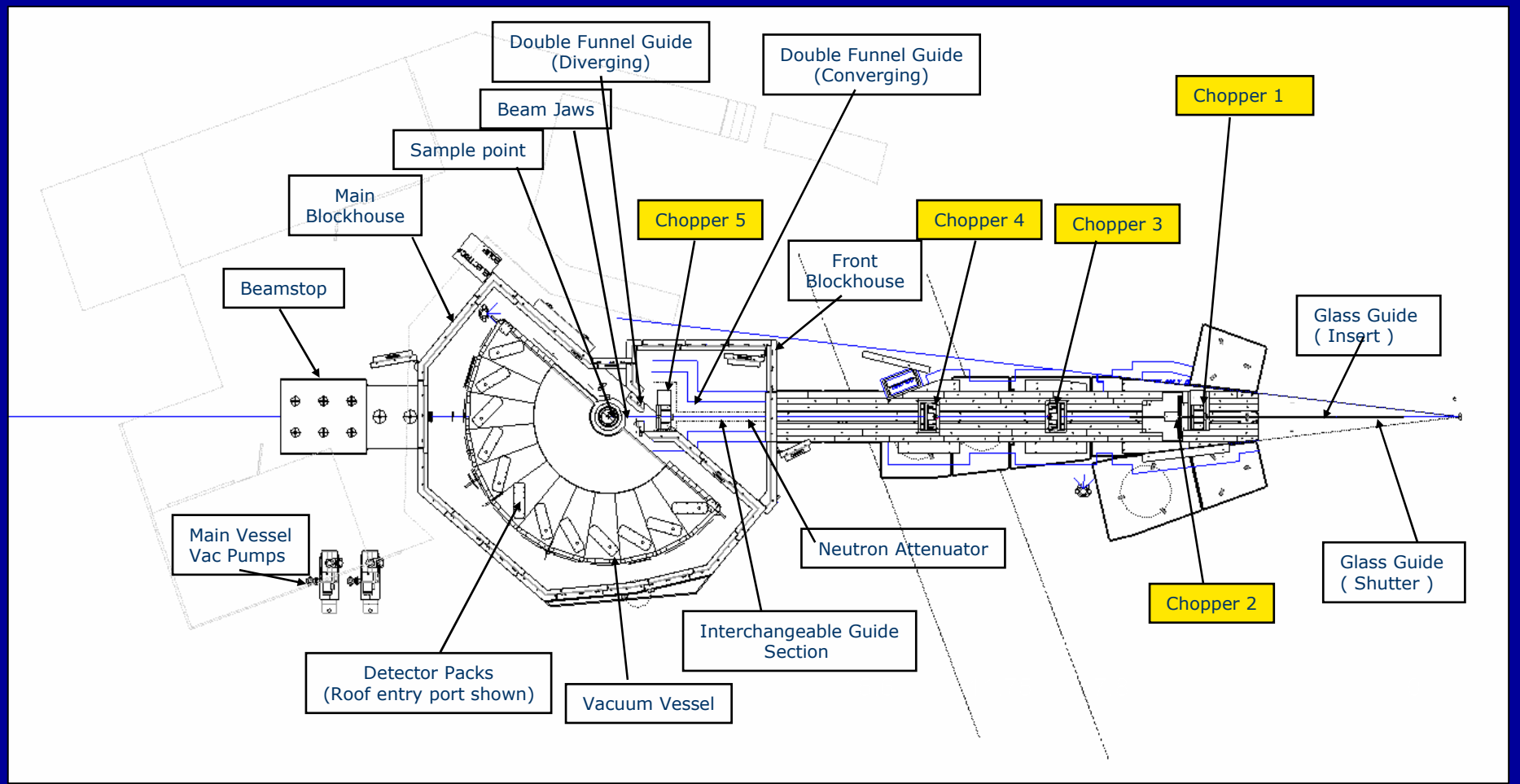
LET detector tank

LET features



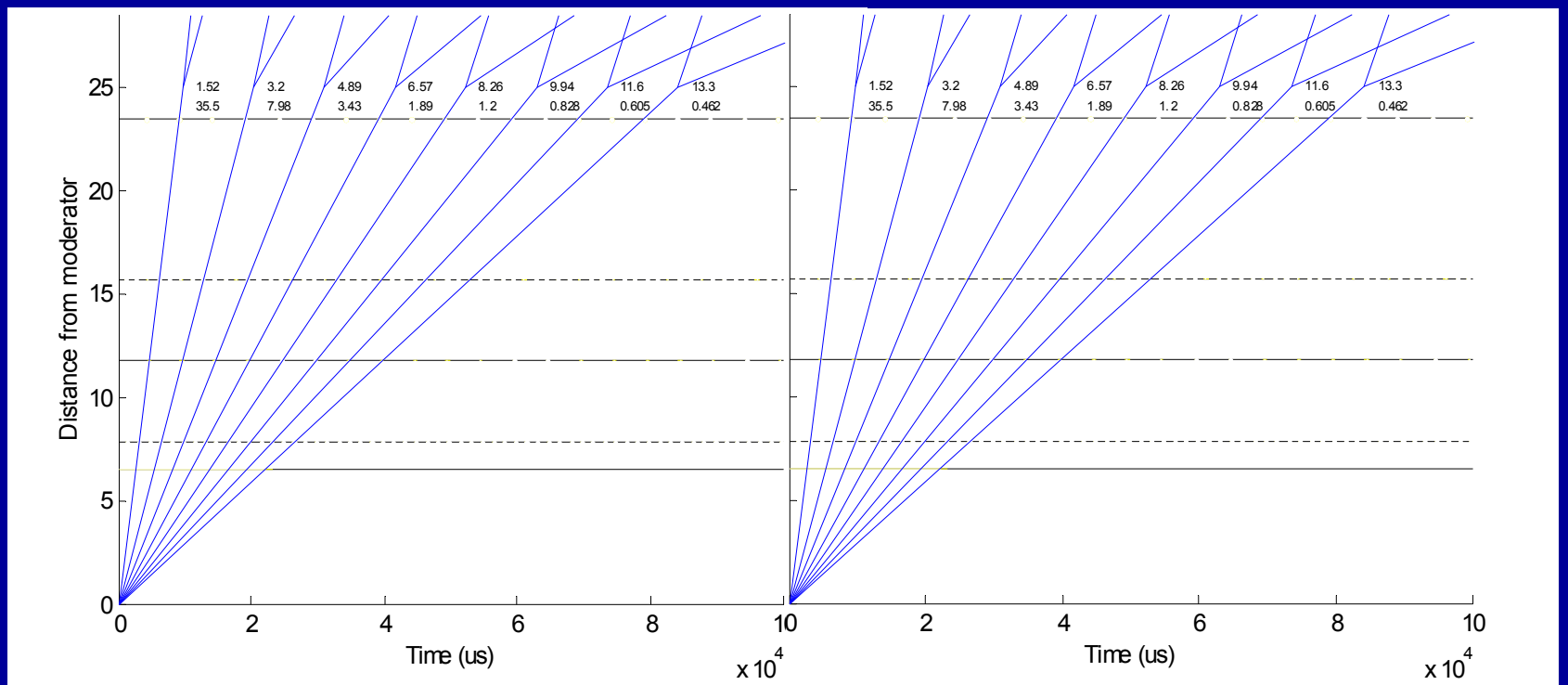
Distance (m) 28.5 25 23.5 15.6 11.75 7.8 0

LET features



Choppers

chopper configuration allows multiple measurements in one time



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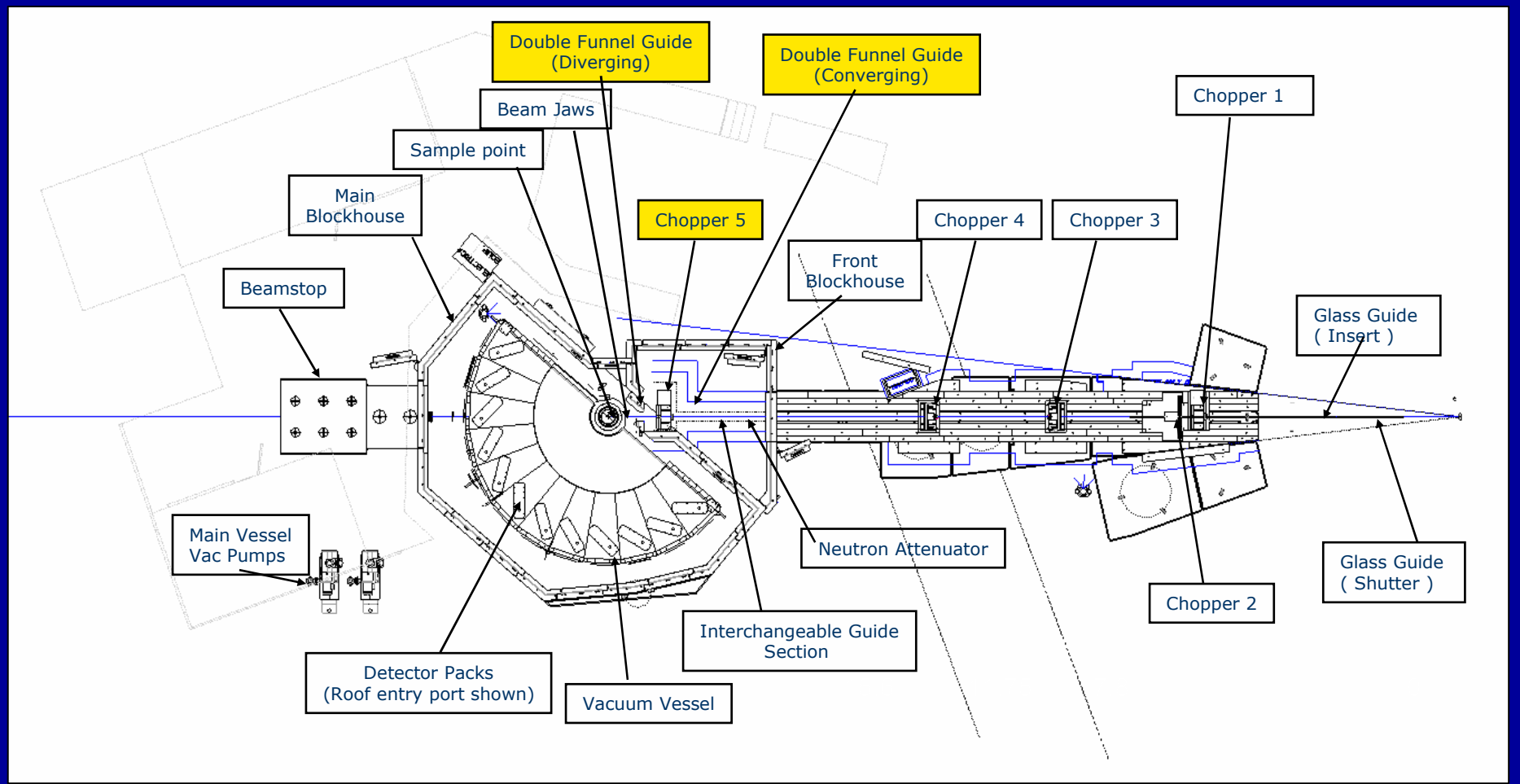

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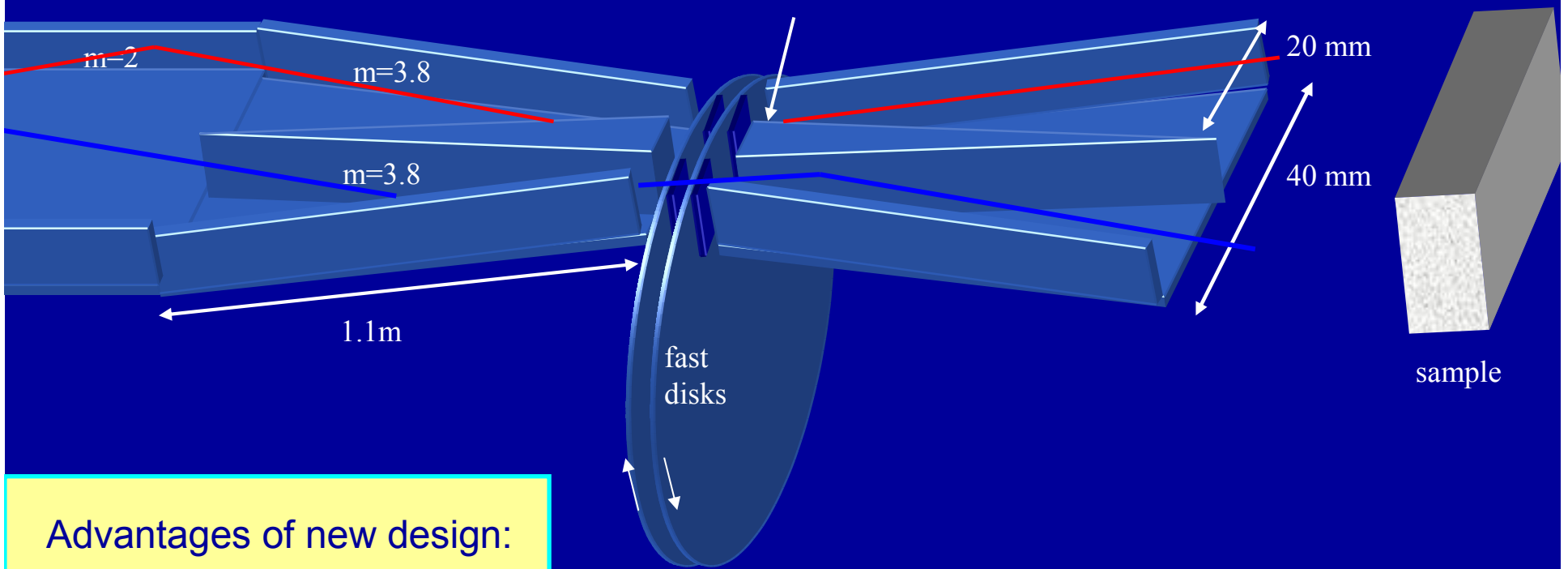
Chopper 5

Novel double-funnel guide and chopper system



Advantages of new design:

Up to 4x more flux in high resolution mode

Beam size is independent of resolution

Chopper 5

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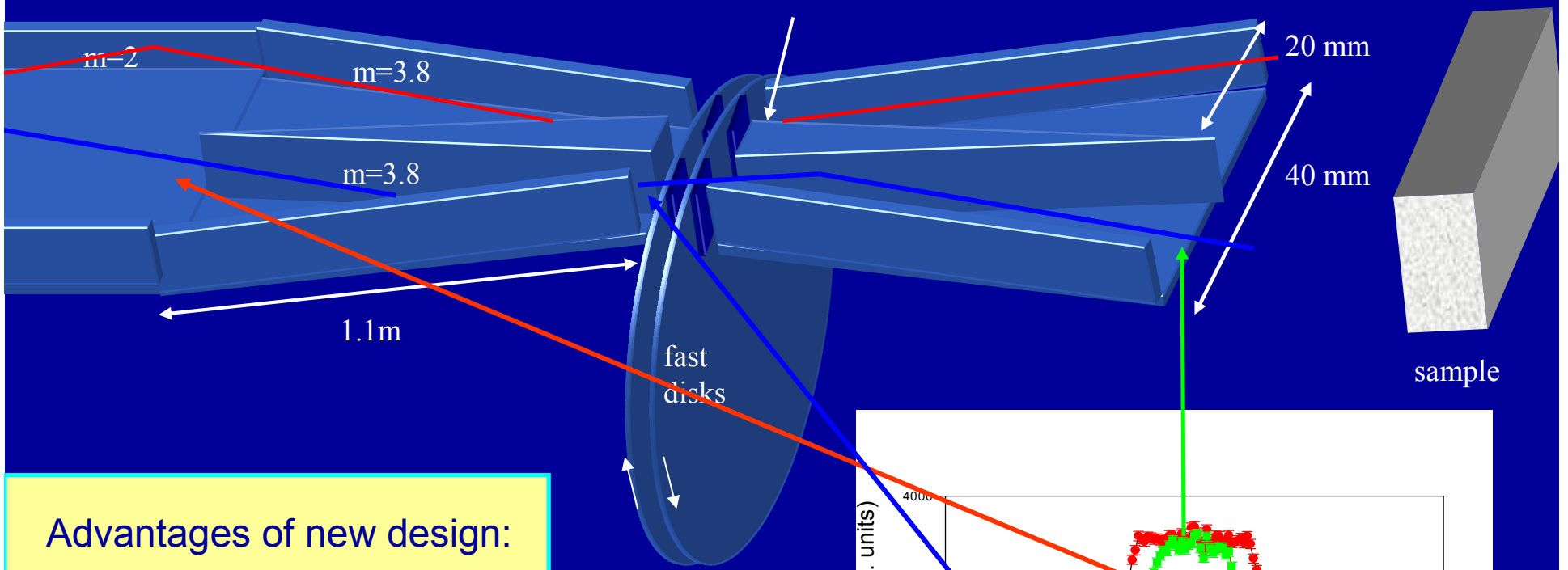

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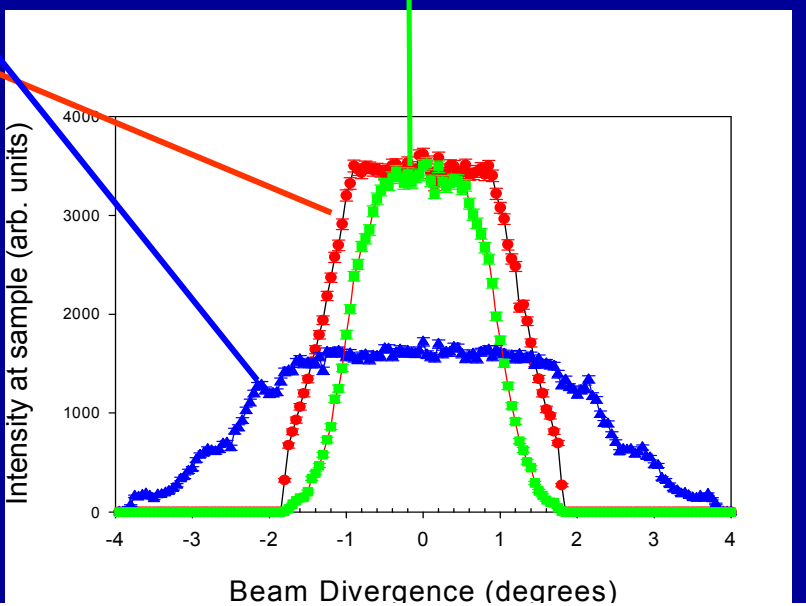
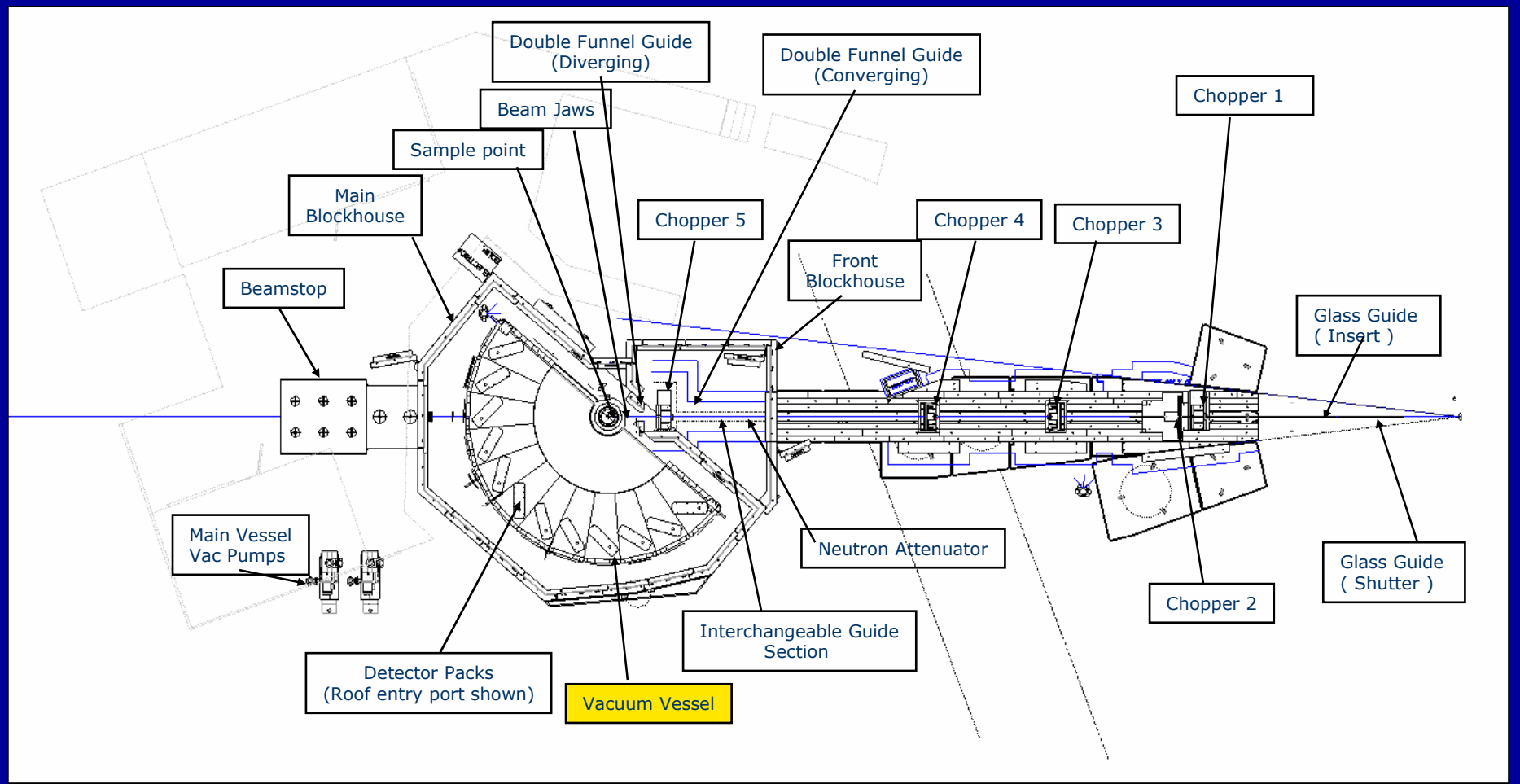


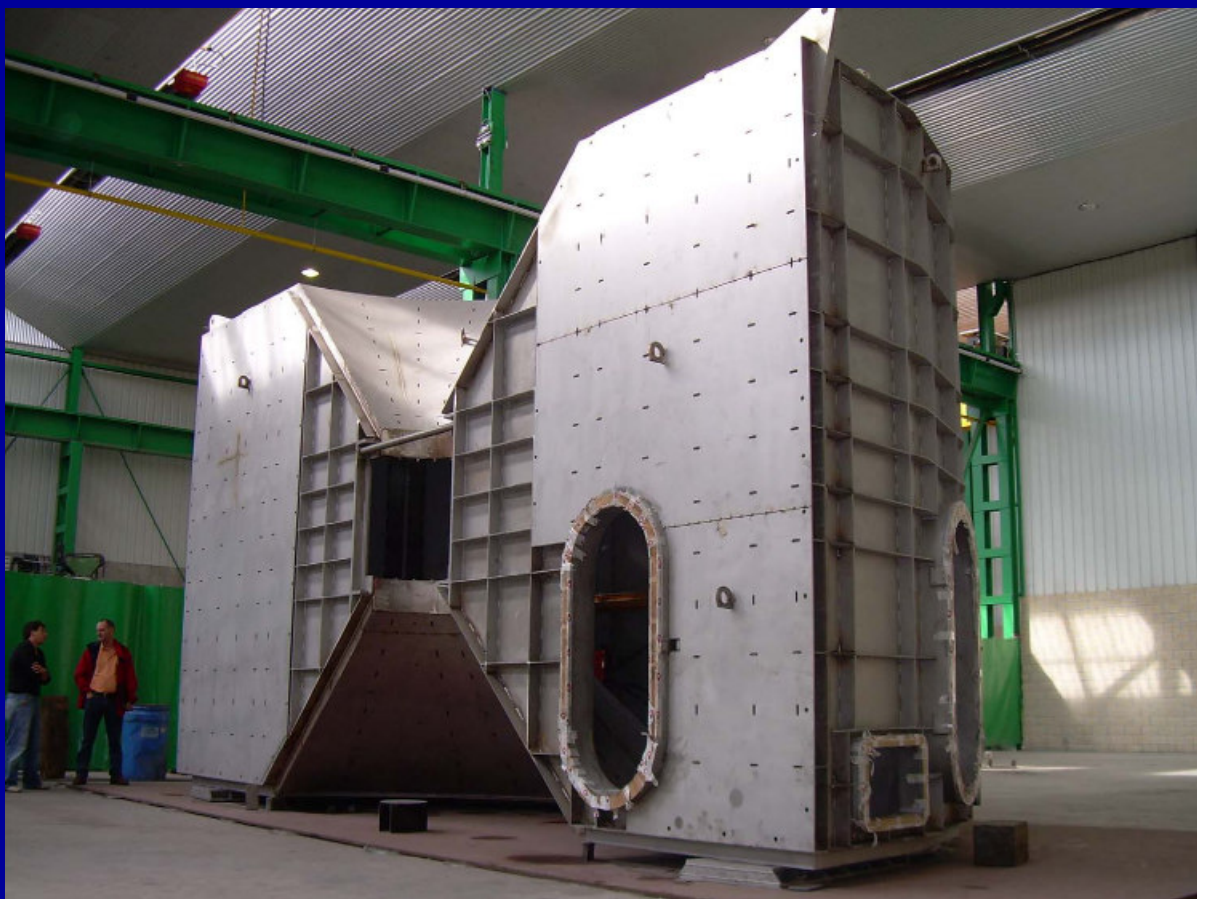
LET features



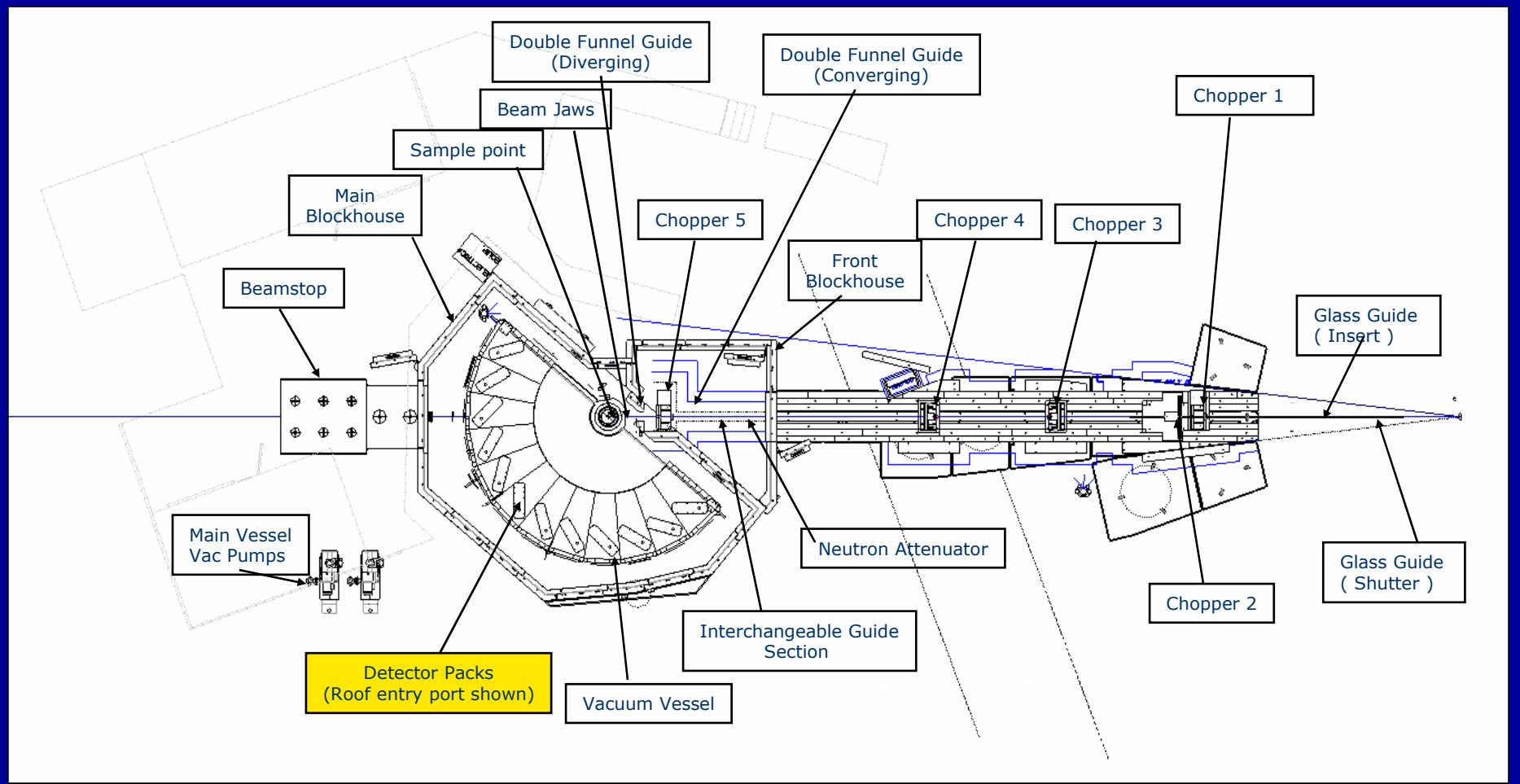
Distance (m) 28.5 25 23.5 15.6 11.75 7.8 0

Detector Tank

- New tank design
  — easier to construct
- No windows
  — pumped to 10^{-6}mbar
- Non magnetic
  — can use magnets and polarized neutrons



LET features



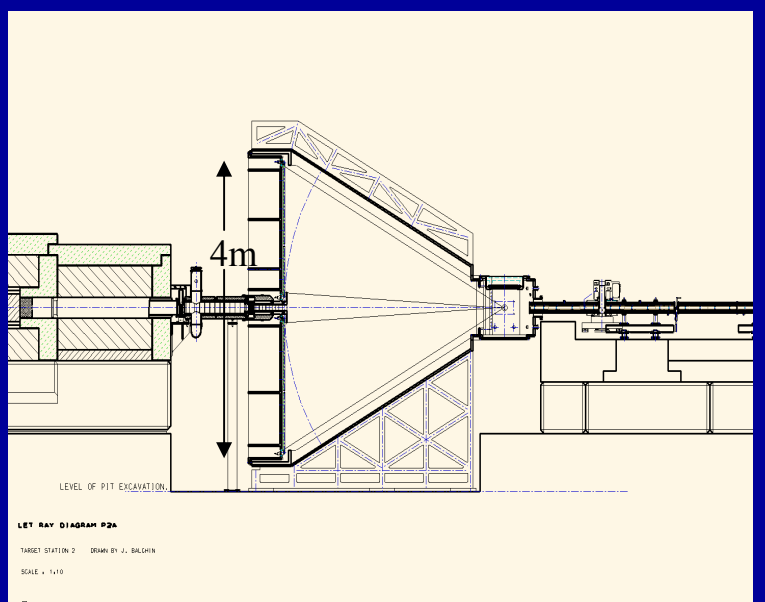
Distance (m) 28.5 25 23.5 15.6 11.75 7.8 0

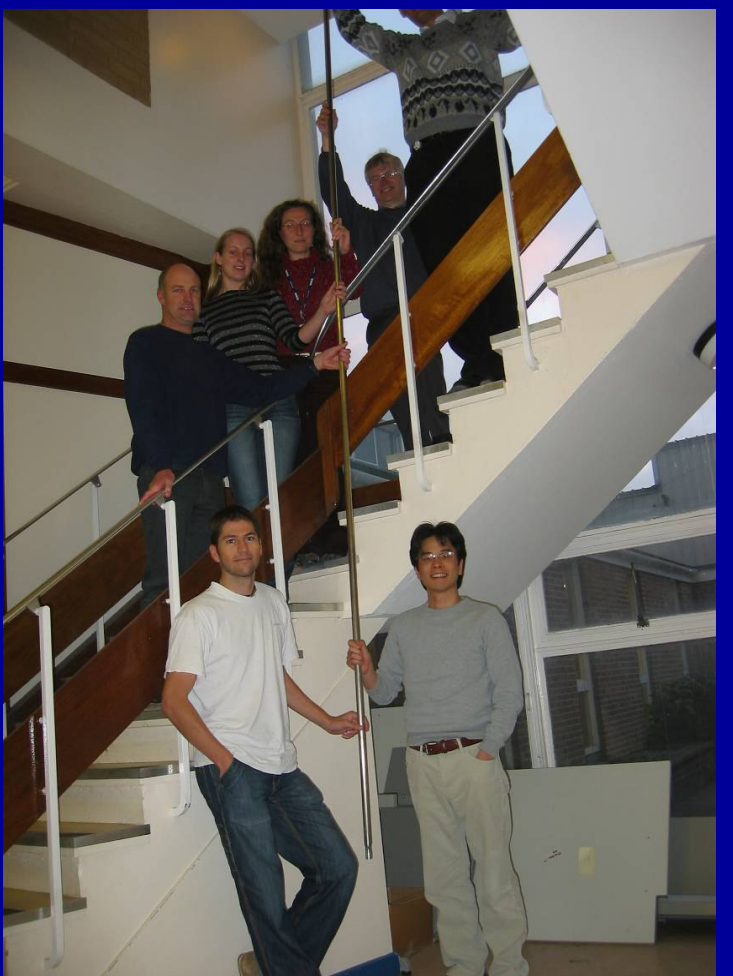
Detector Tubes

- 4m long PSD tubes, virtually gapless
- Detectors in vacuum, electronics in air

Tests of 4m tubes on MERLIN
give good results

Position resolution less than 25mm





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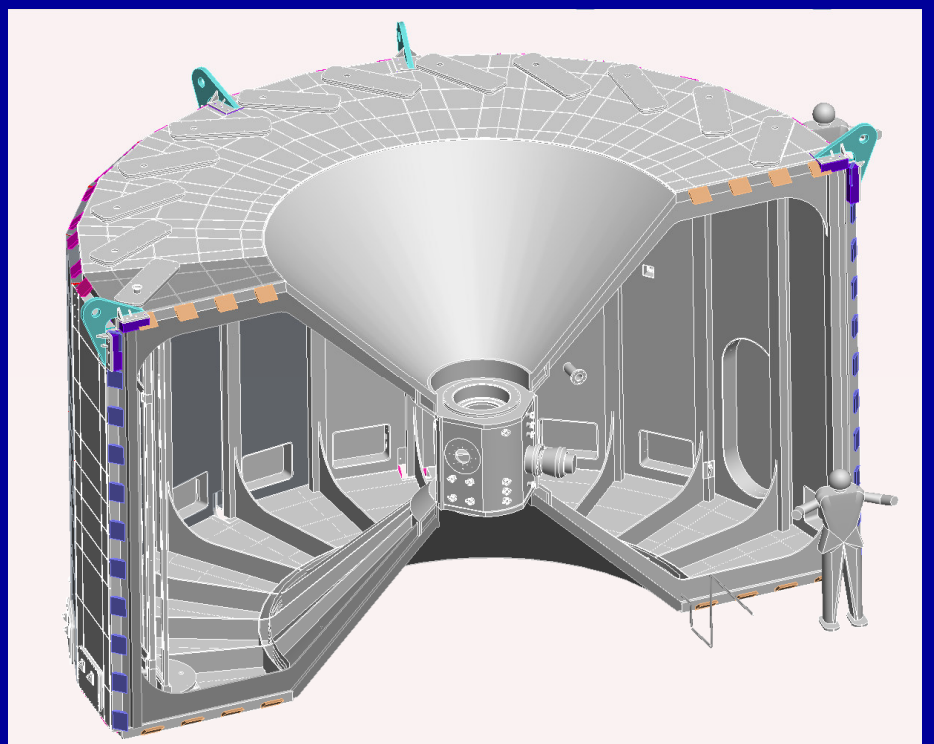

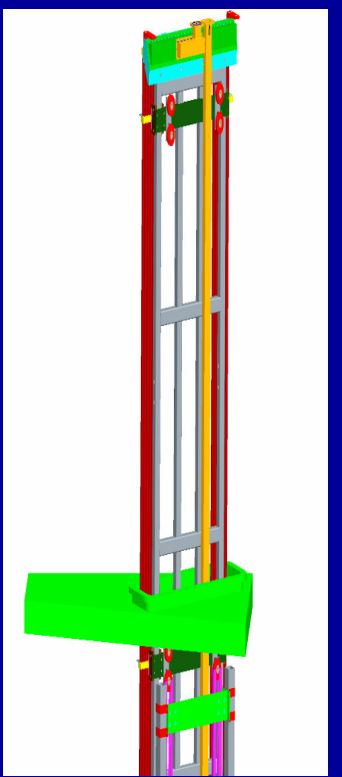

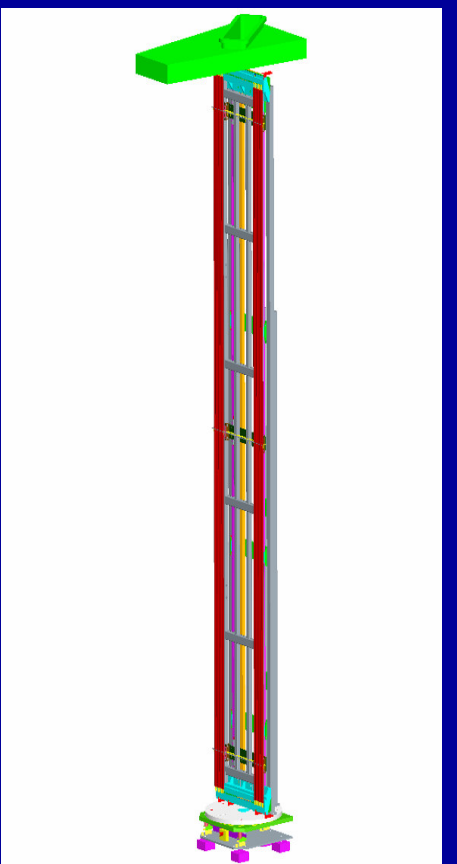

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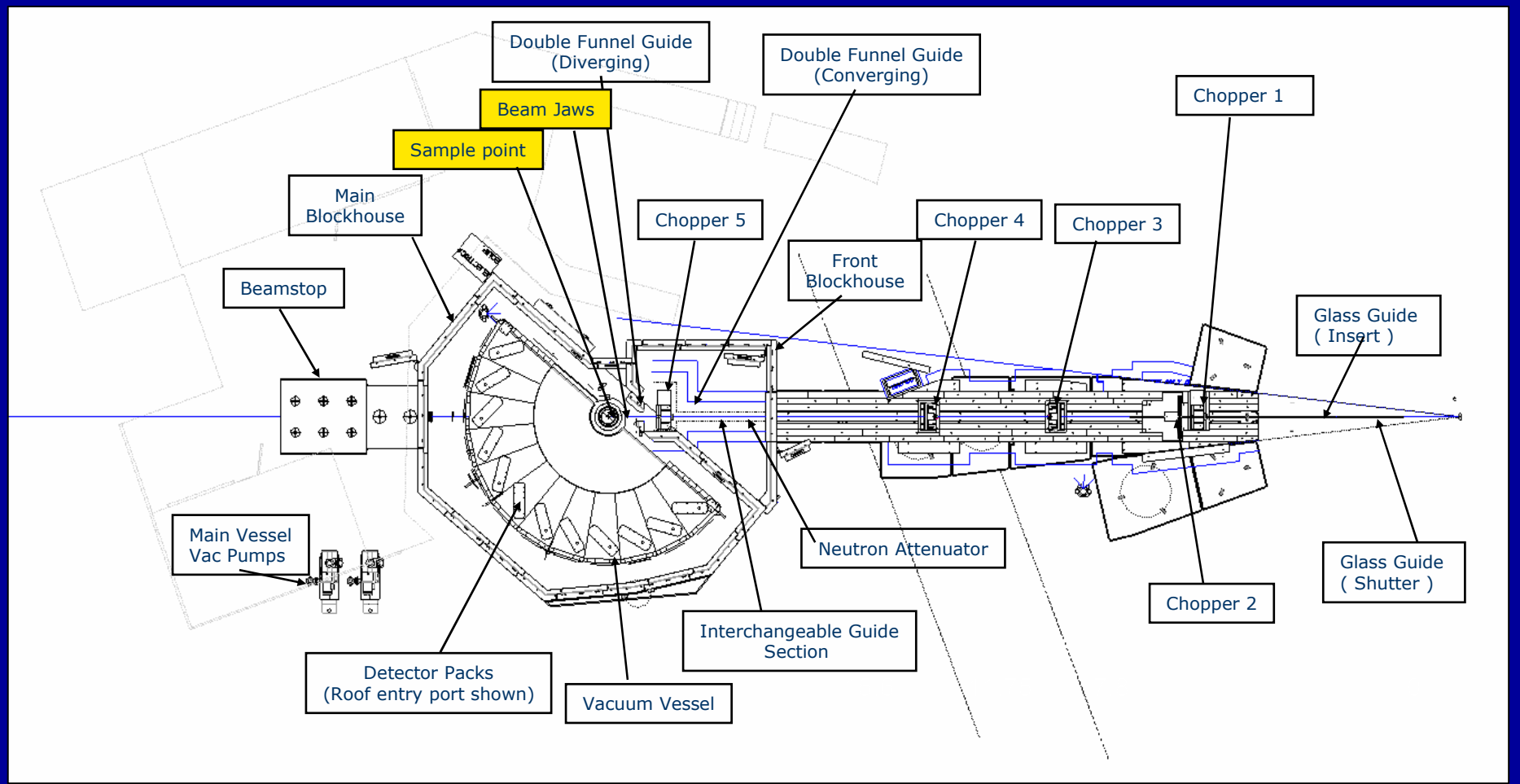

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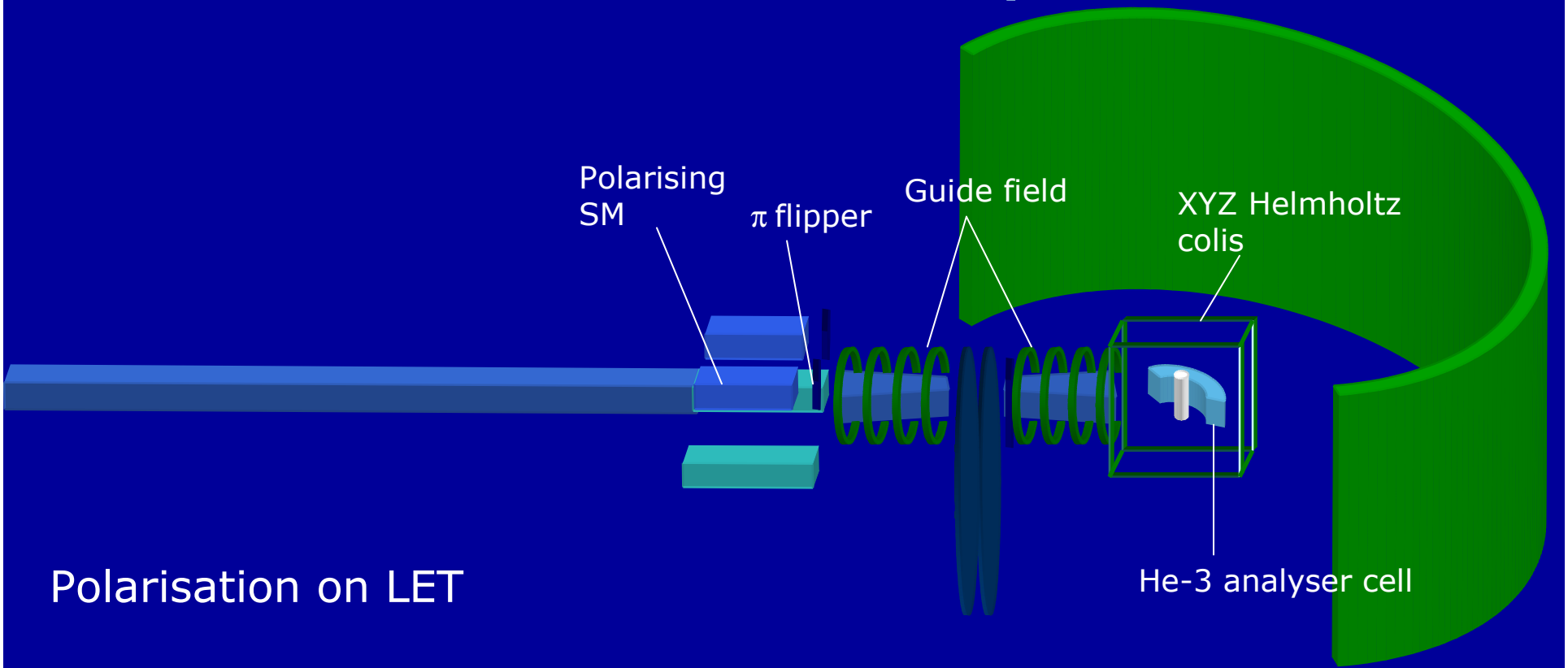
Polarisation option



Polarisation on LET

- PASTIS type XYZ polarization analysis
- Non-magnetic environment around He-3 cell
- Larger flange to insert XYZ coils
- Movable section of guide to insert Polarising SM
- ISIS (Chris Frost) just awarded £1.3 million to design He-3 cells and coils

LET Summary

- Versatile
- Wide dynamic range
- Polarization analysis option
- First neutrons in summer 2008