

Request to put a superconducting magnet at VITO

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With input of N. Azaryan, S. Warren, M. Bissell

Scientific motivation

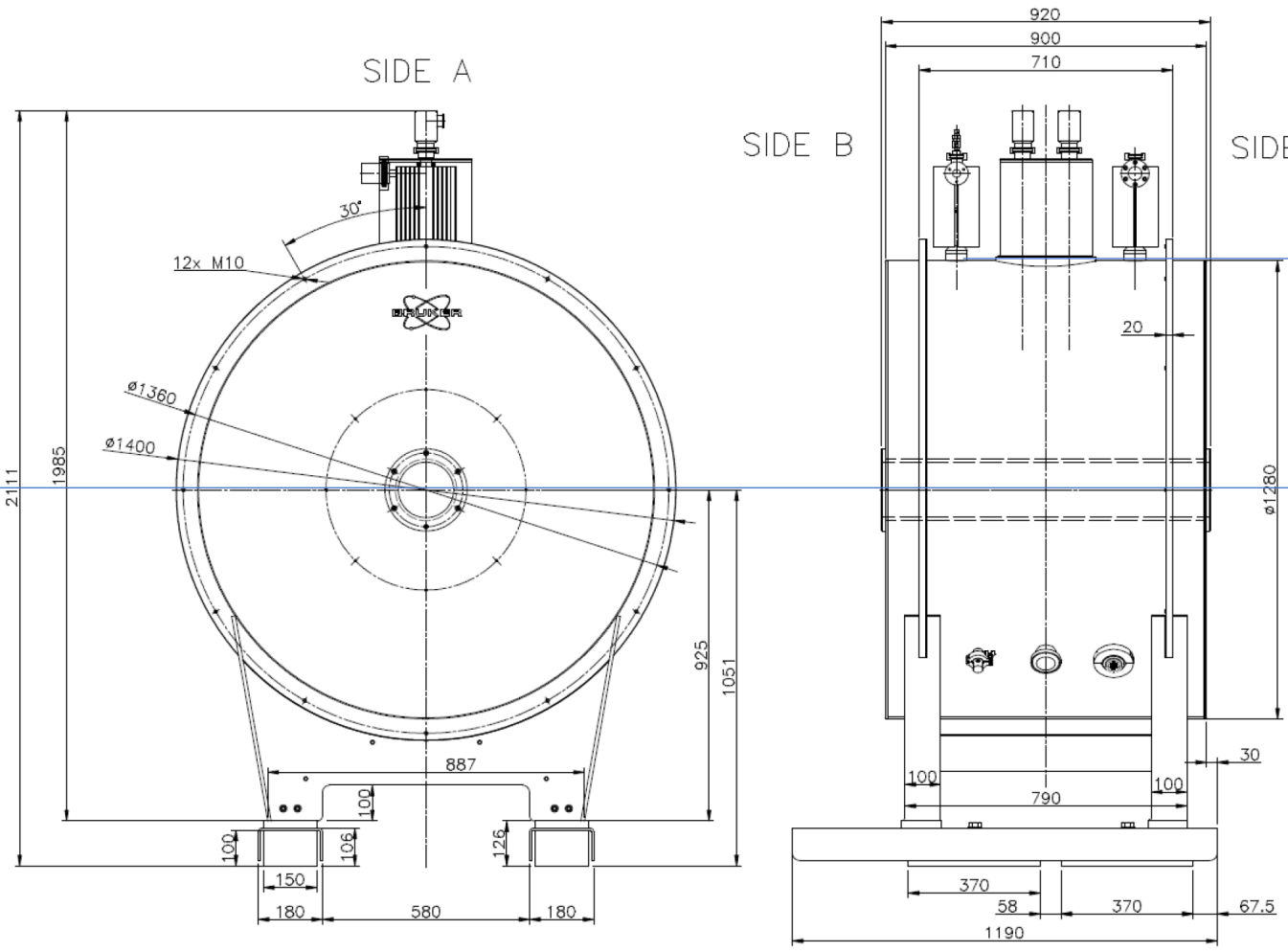
- Higher magnetic field (4.7 T) with better homogeneity (< 1 ppm) than present electromagnet (1.2 T and 1-5 ppm)
- Motivation: higher NMR resolution, allowing to resolve better shifts in resonance frequencies from Na and K in biological samples (dozen ppm)
- In addition, the same magnet can be used for:
 - ppm-precision measurement of magnetic moments
 - Solid-state studies
- Science until LS3 described in submitted LOI:
<http://cds.cern.ch/record/2706142?ln=en>

4.7 T SC MRI animal scanner

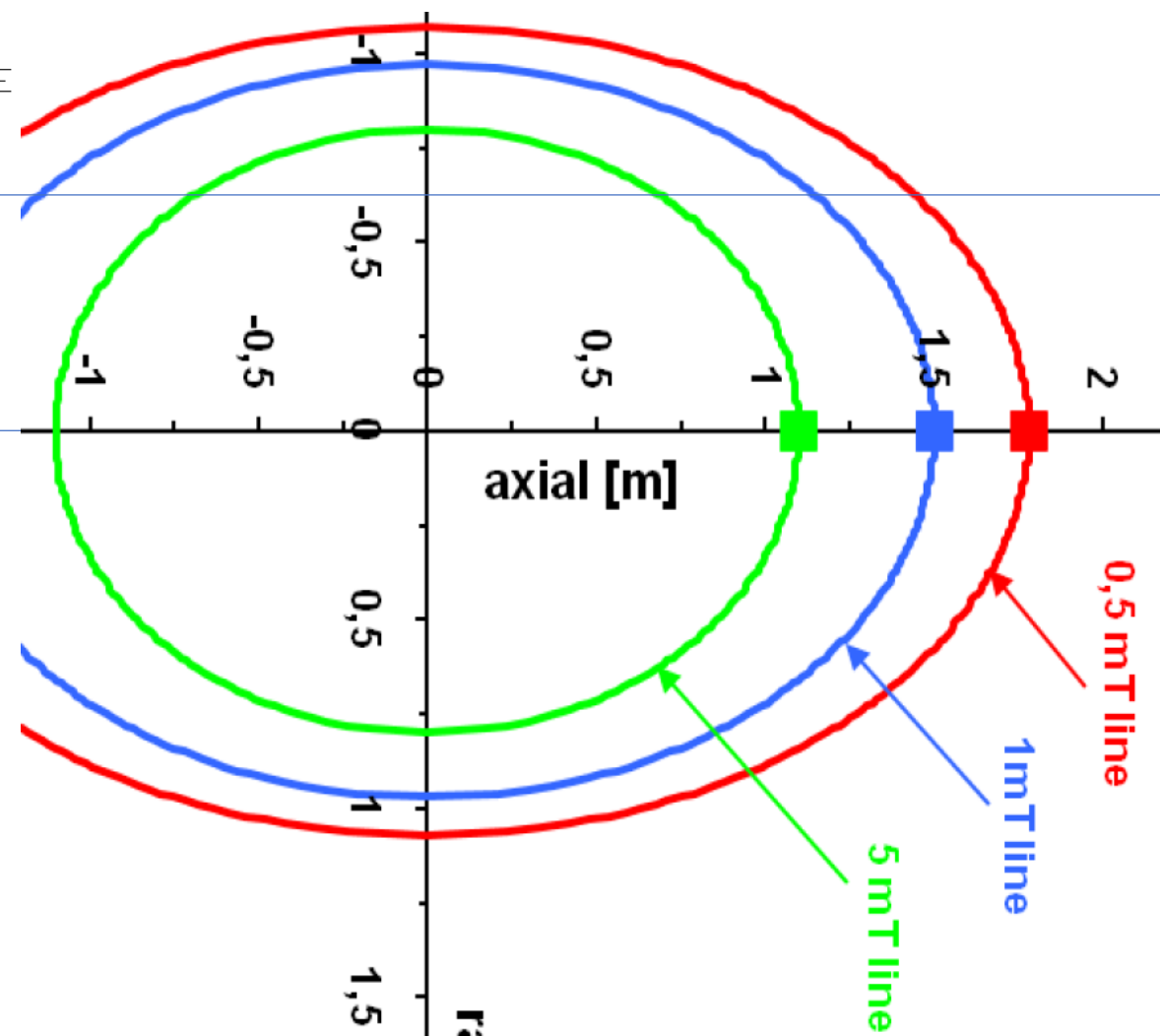
- Needed to be moved away from ETHZ lab by Jan 13th 2020
- Moved by manufacturer (Bruker) to CERN and stored (B0=0) in b275 →
- Safety file in b275:
<https://edms.cern.ch/document/2306733/1>



Specs



Strayfield, to scale with the magnet dimensions



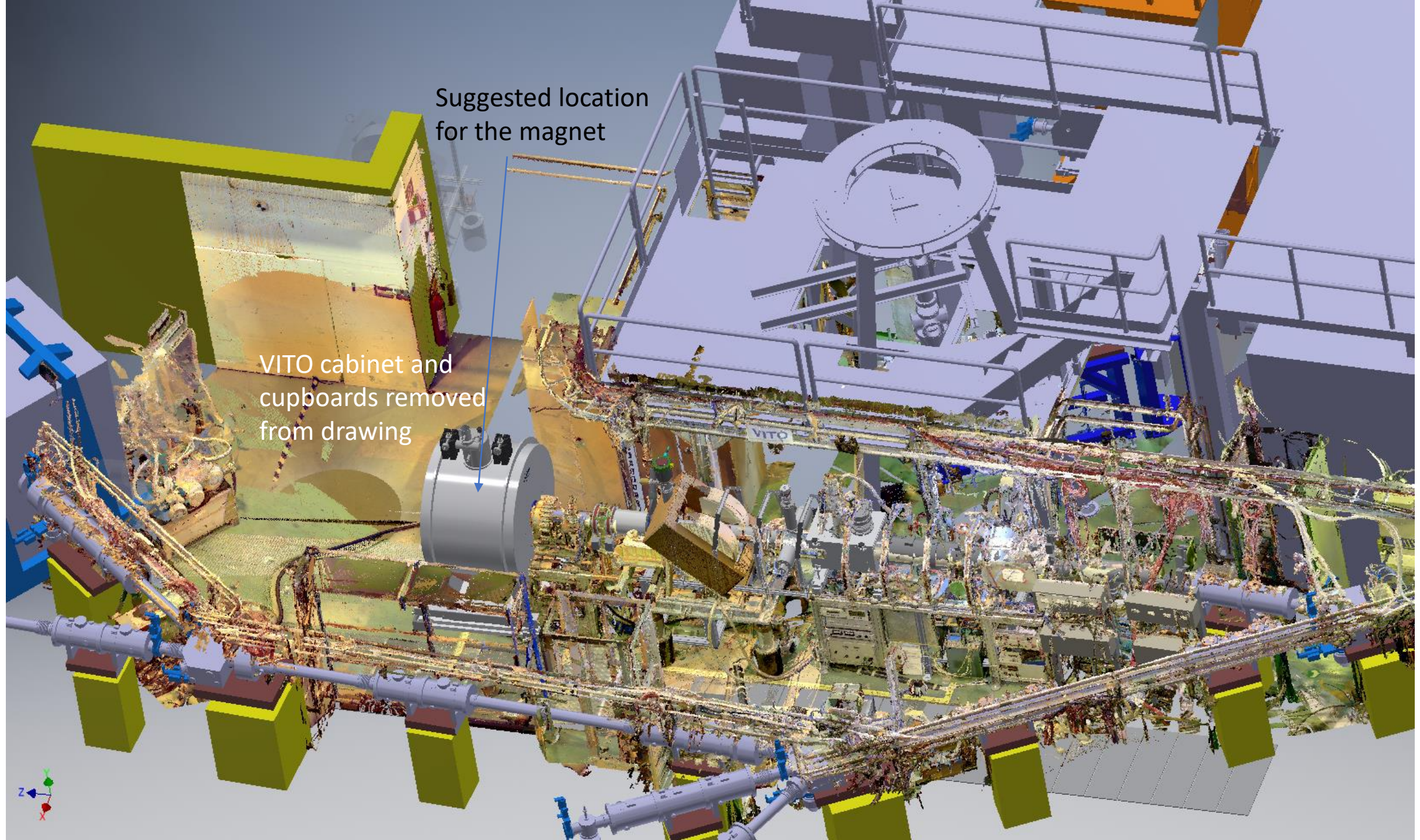
The magnet at VITO

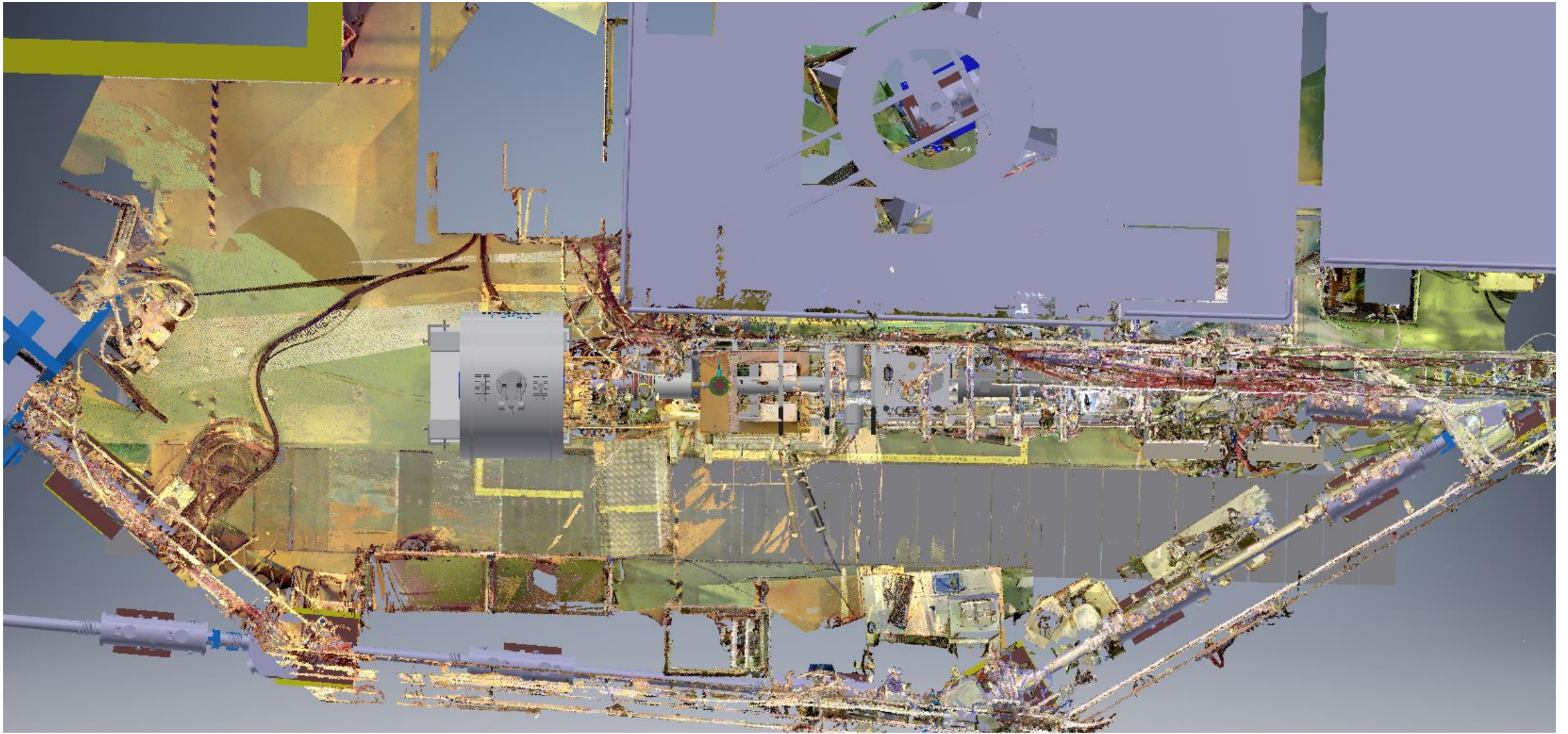
- Safety file at VITO: <https://edms.cern.ch/document/2326693/1>
- EP Safety team requirement:

| Key hazards identified | Location | Measures to be implemented |
|---------------------------------------|--|--|
| Cryogens (Liquid Helium and nitrogen) | Inside magnet Dewar | Fill cryogens according to manufacturer's instructions, only by trained and authorised personnel. |
| Magnetic Field | 1.7 m around magnet front and rear apertures | Area is zoned and clearly indicated by a 5 Gauss line. Plastic chain and high field warning markers in area. |

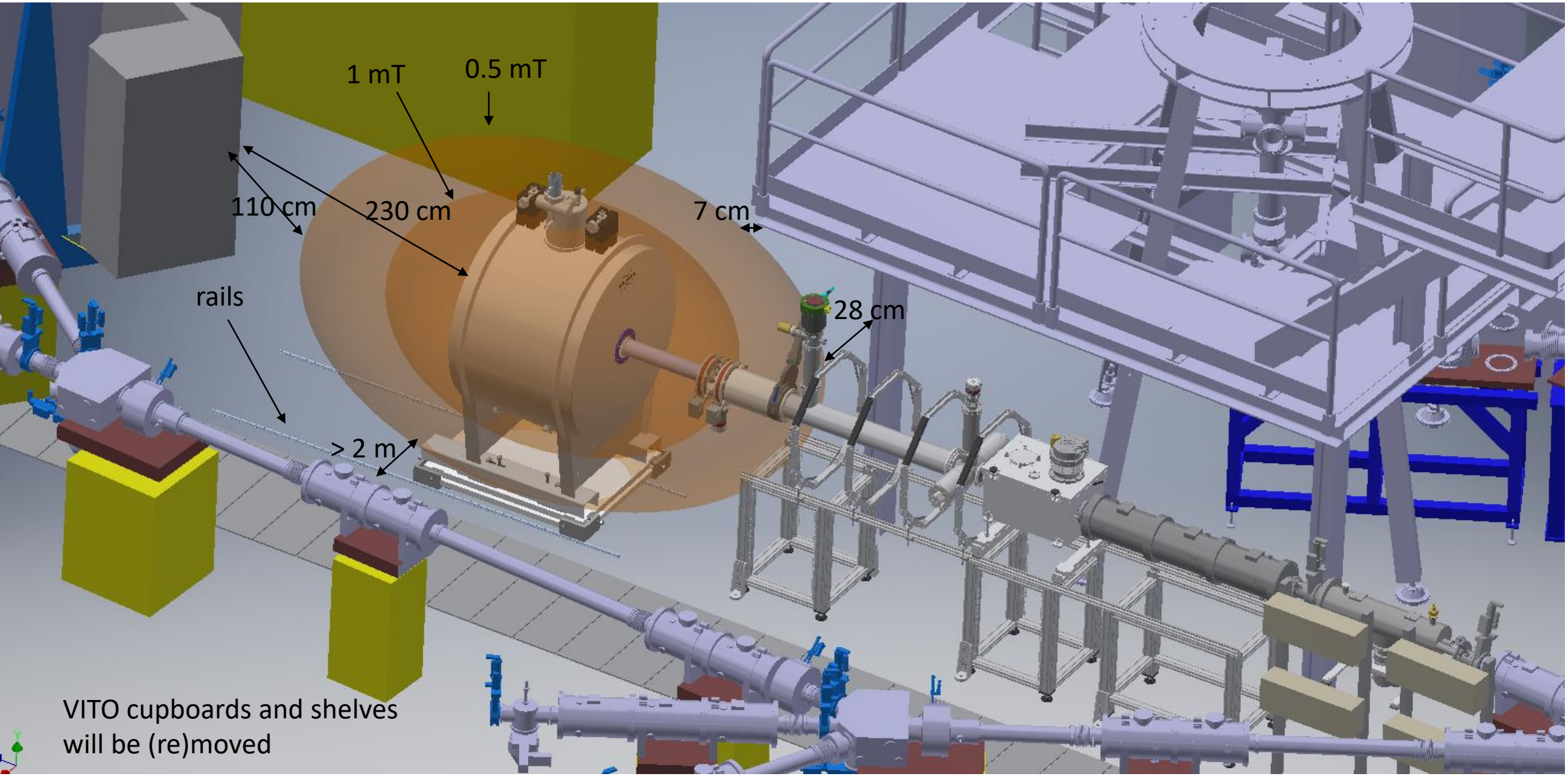
Suggested location
for the magnet

VITO cabinet and
cupboards removed
from drawing

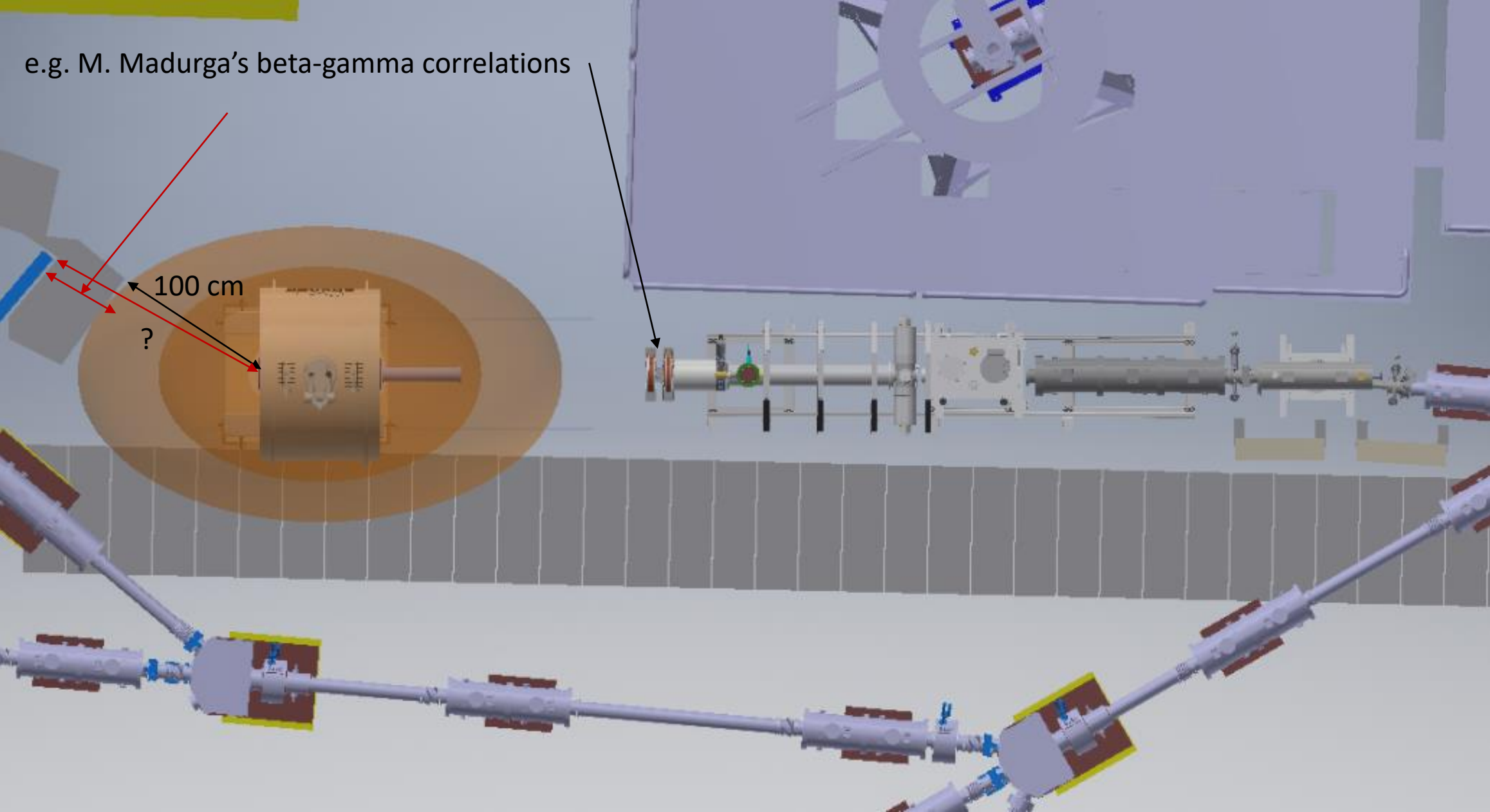




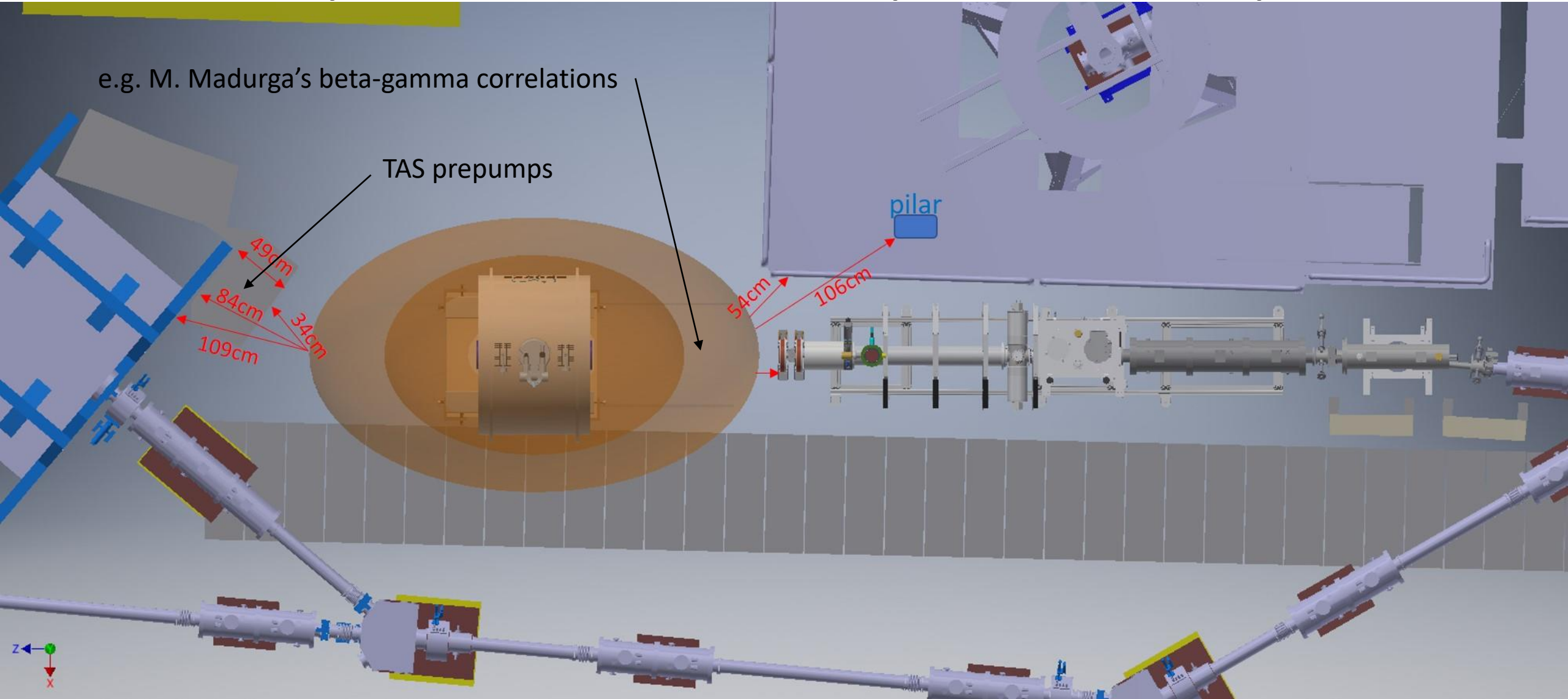
Base layout for 2021 (with funding and hardware available)



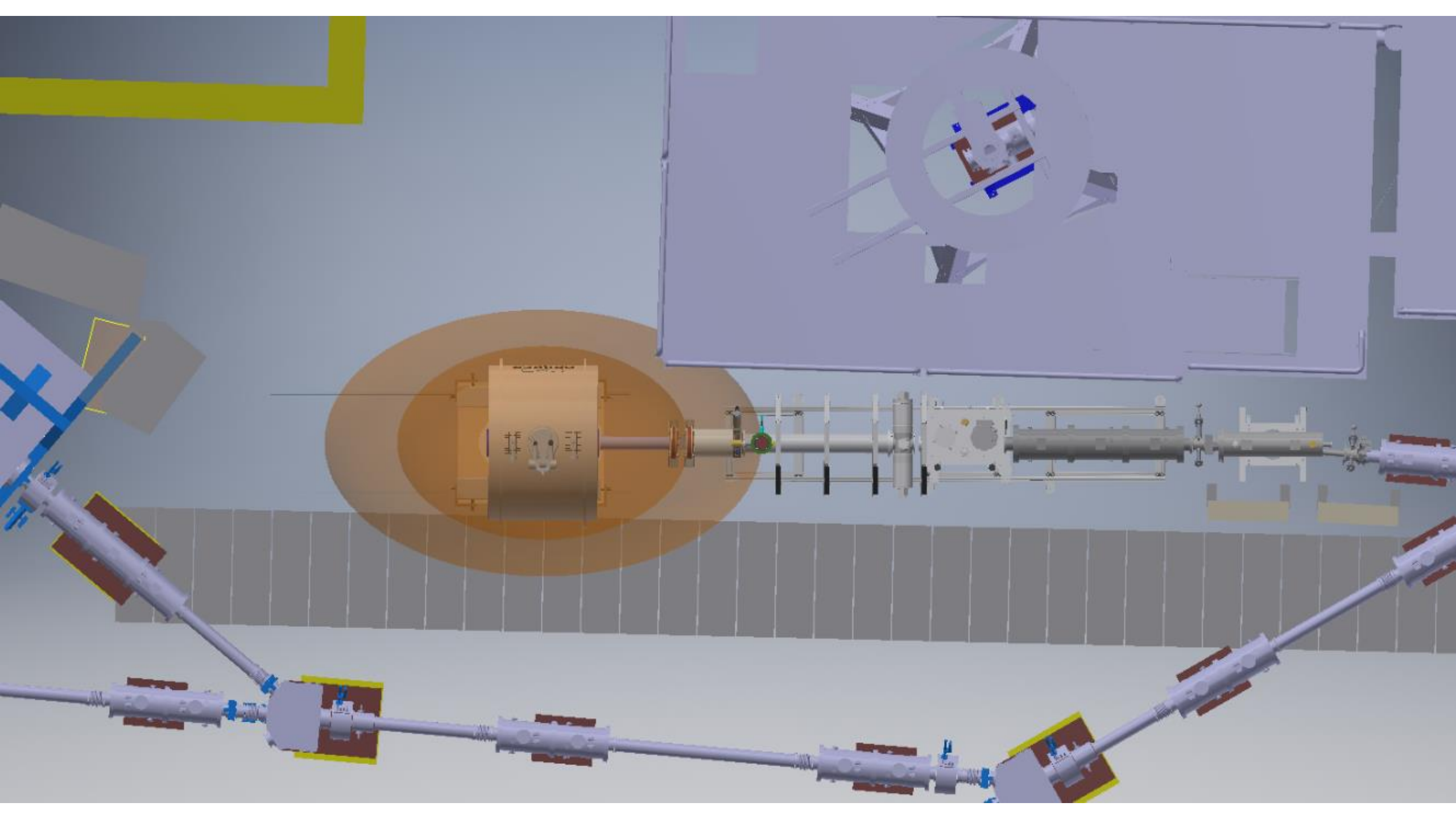
Possible layout, if a new VITO setup needs more space for tests

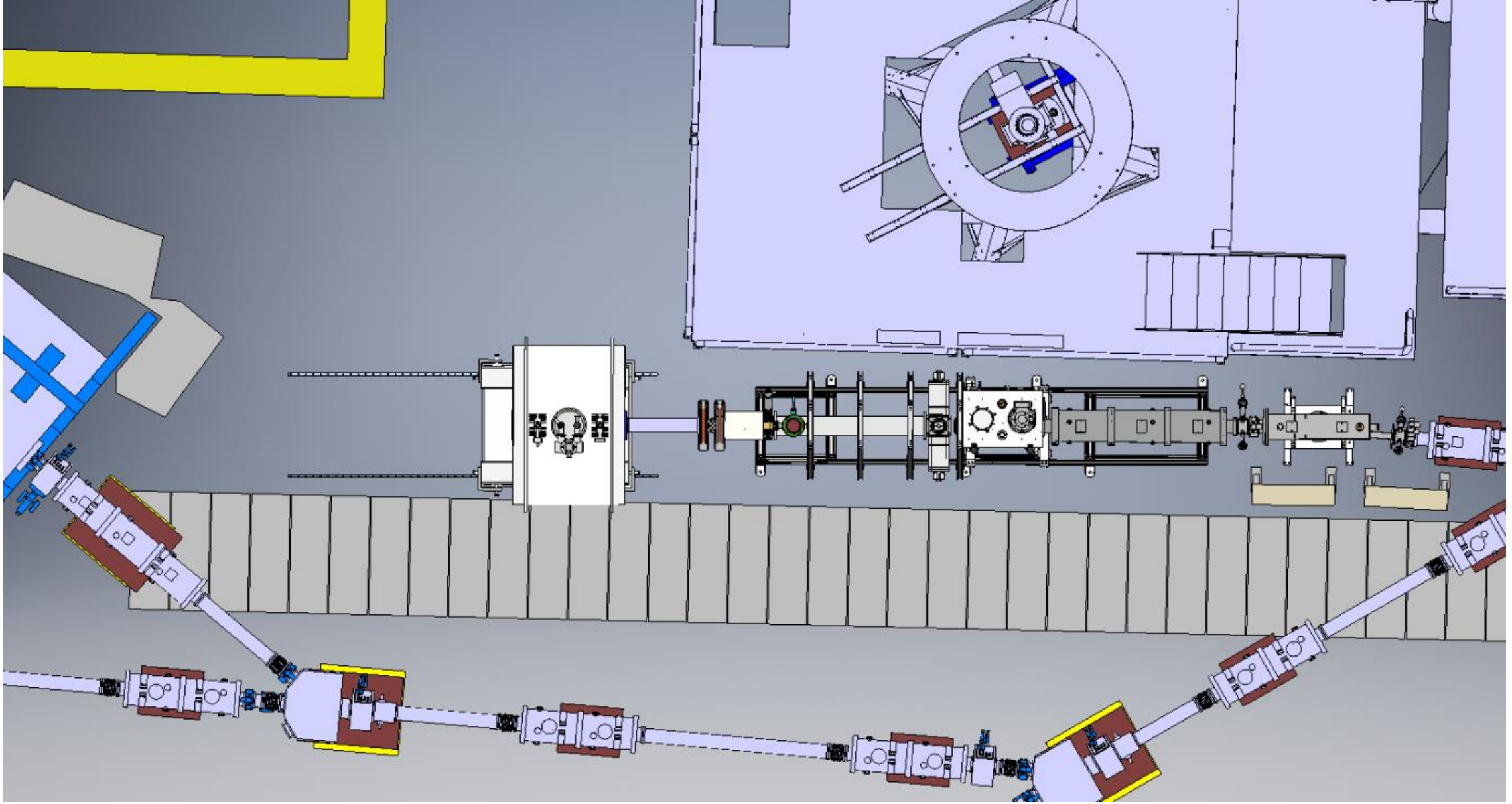


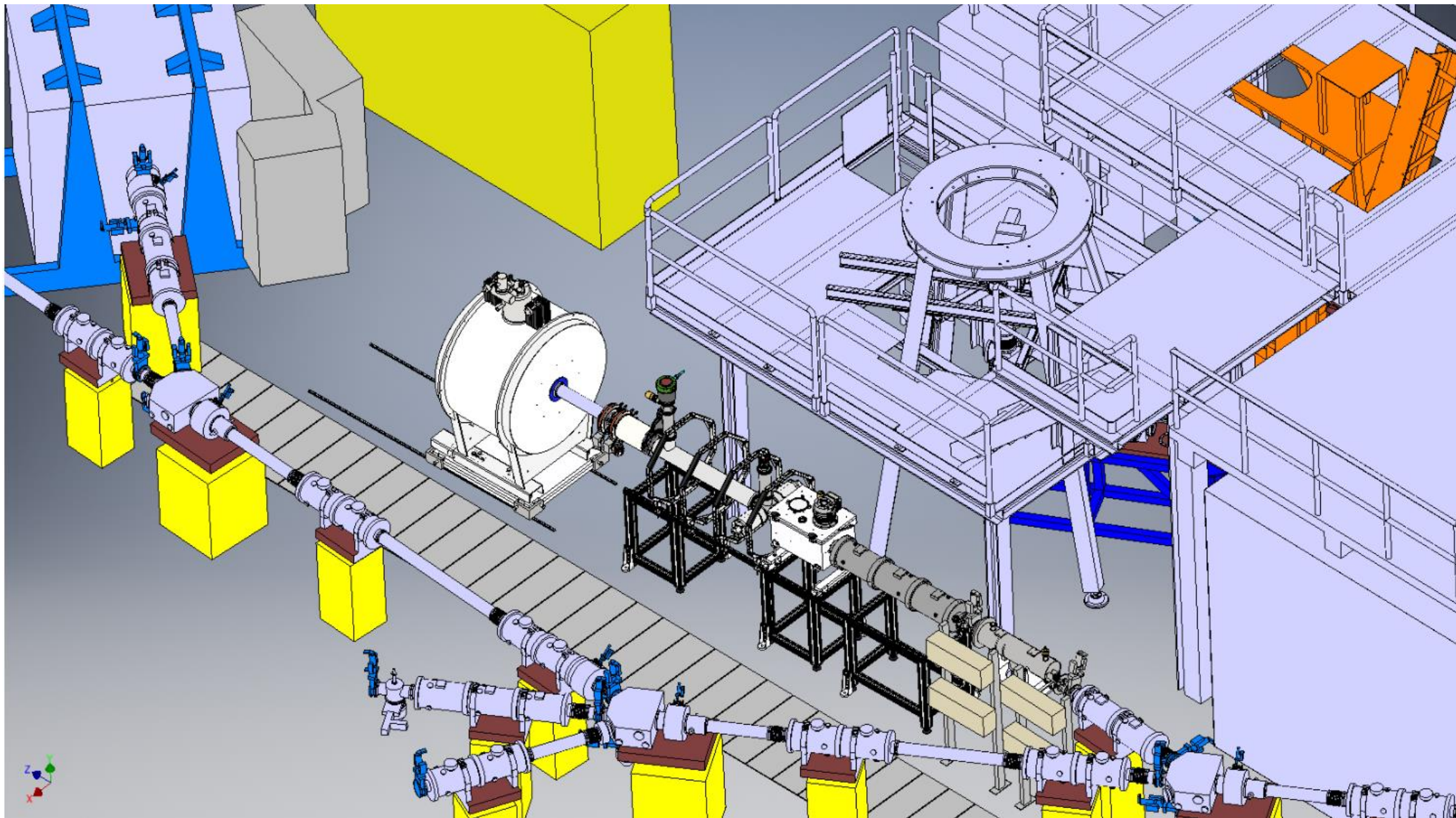
Alternative layout, if a new VITO setup needs more space for tests



Backup







BRUKER

