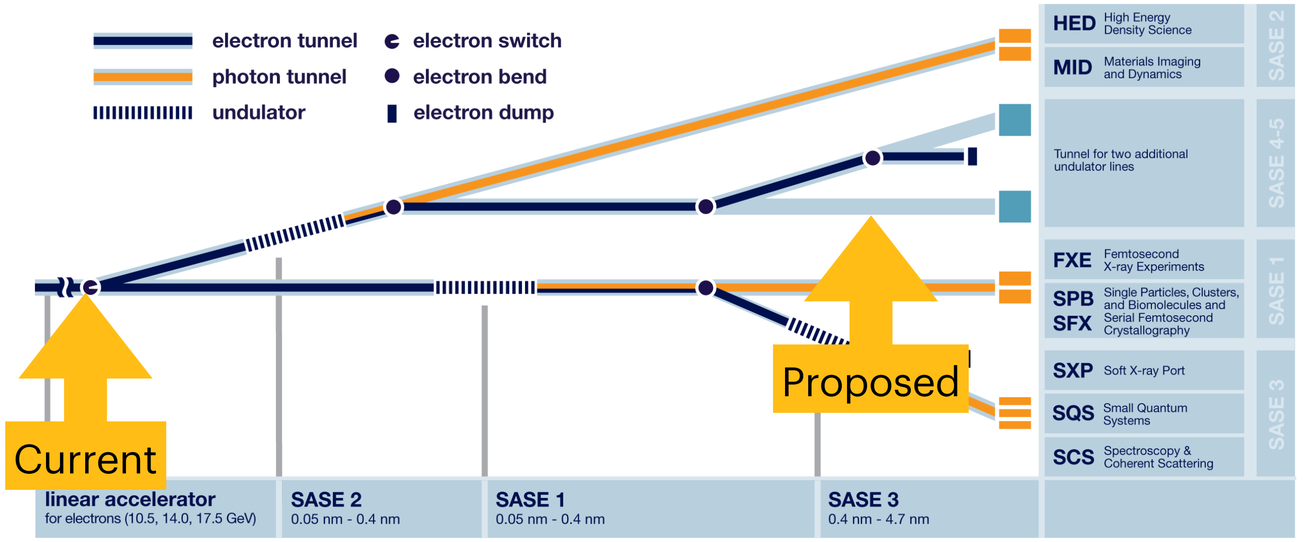
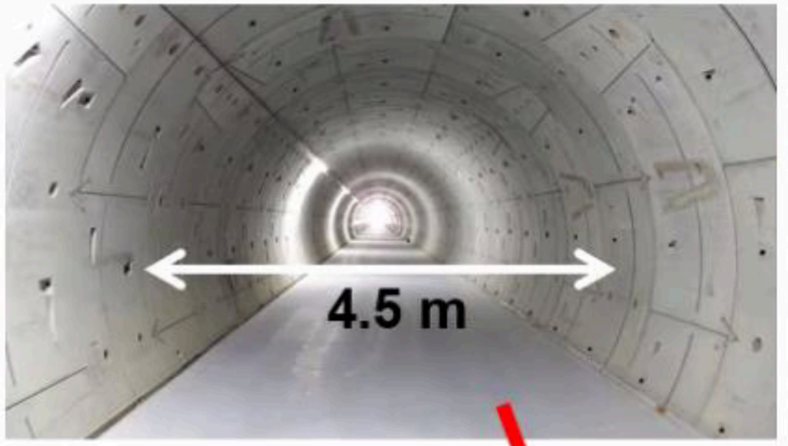
ELBEX project

- **New location**: one of the (currently) empty photon tunnels
- More space longitudinally than in the XTD1 location (~25 m)
- Easier access, even during XFEL operation
- Not too deep underground (~6 m)
- Laser will have to travel ~200 m
- Front-end readout (and power?) will have to be in the tunnel
- We have the 25m-long XTD1 GEANT4 + CAD models
- XFEL/DESY need some radiation input



ELBEX project

Slide stolen from Ties



XTD photon tunnels

diameter of 4.5 m,
6+ m underground

Use existing
SASE2
undulator

New photon
transport tube

Multilayer mirror
deflection **2.5°** towards SASE4
(~50 mm length) hit by
electron-beam „flipping“

Sealed-off part of tunnel as
experimental hutch
→ Already shielded and interlocked

Lab space for kJ laser from
best suitable supplier.
No new building

ELBEX project

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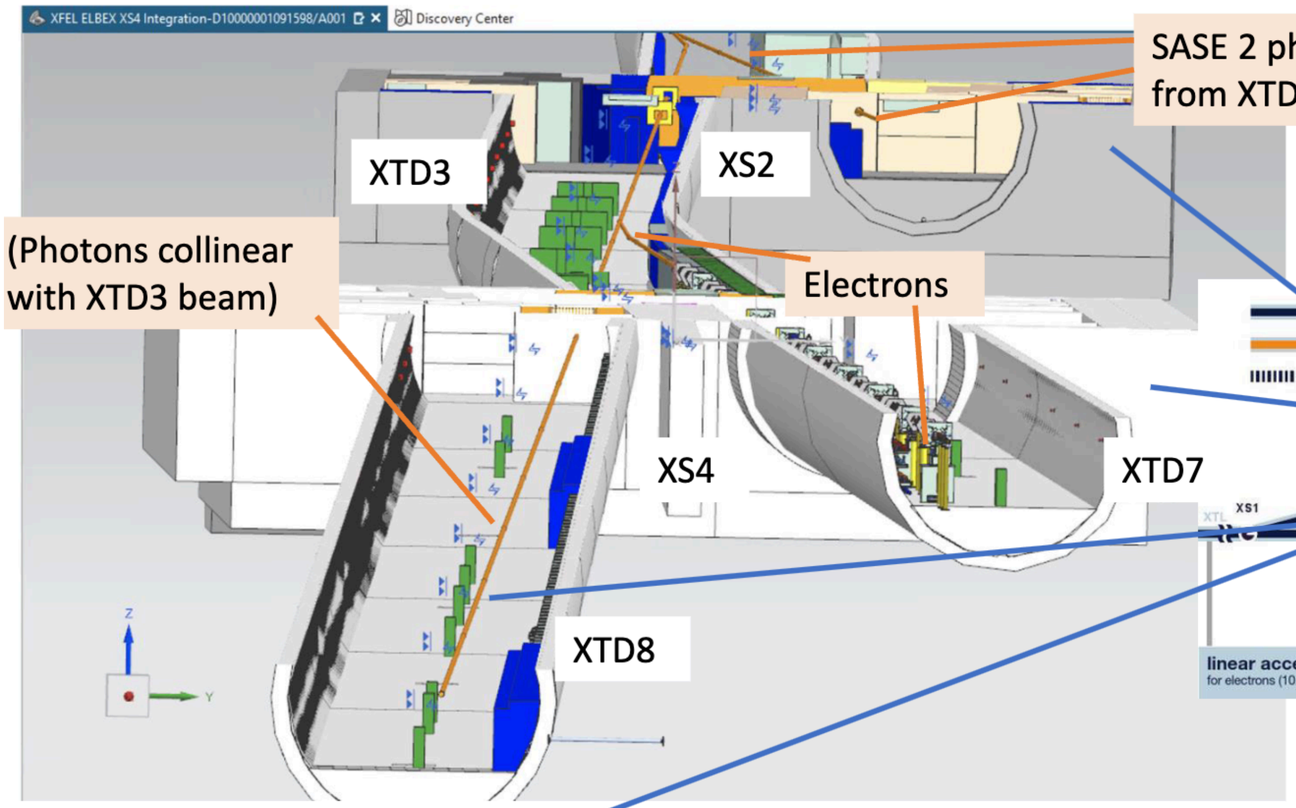
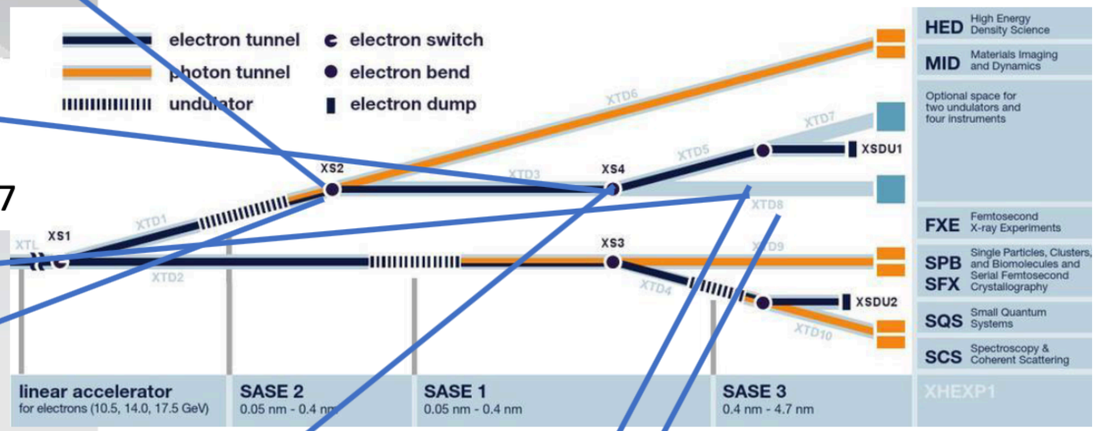
XTD1

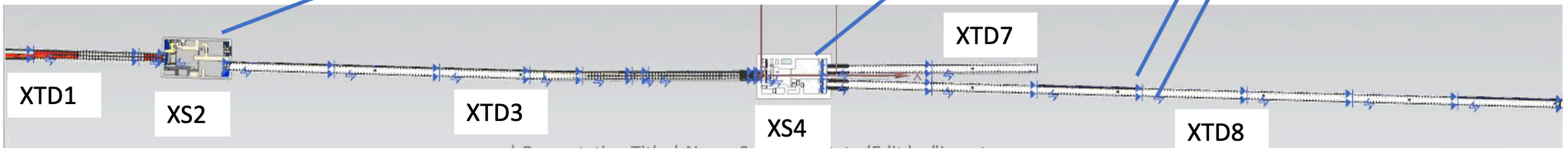


SASE 2 photons from XTD1

(Photons collinear with XTD3 beam)

Electrons



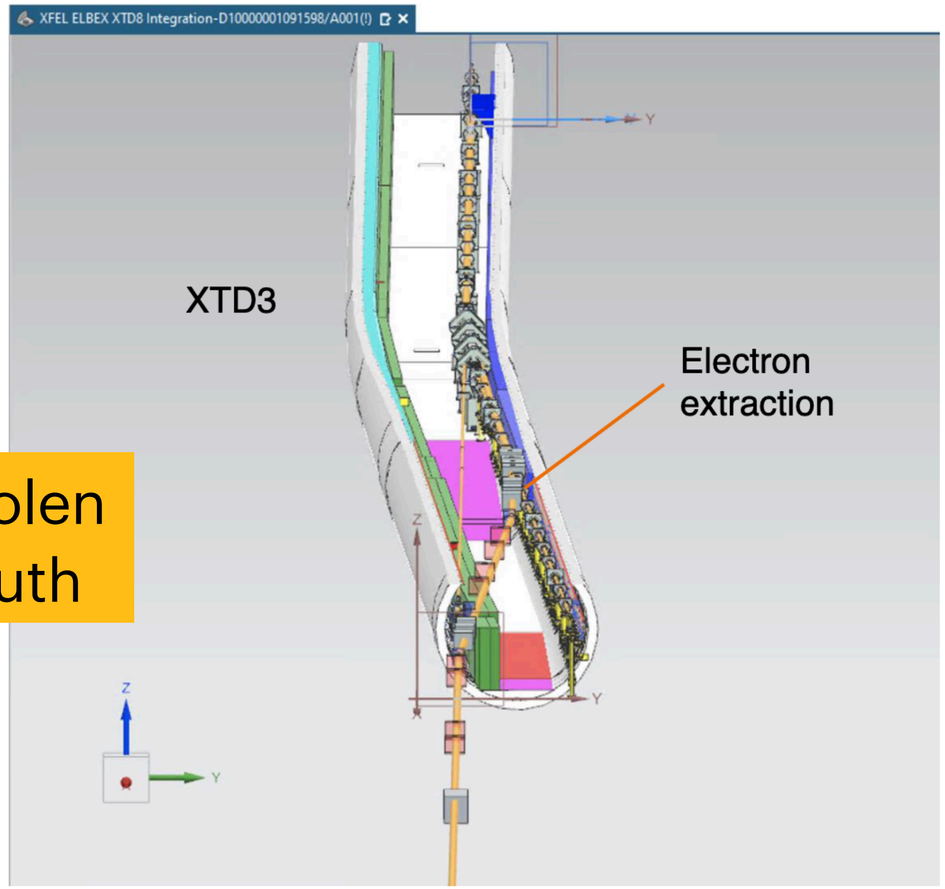


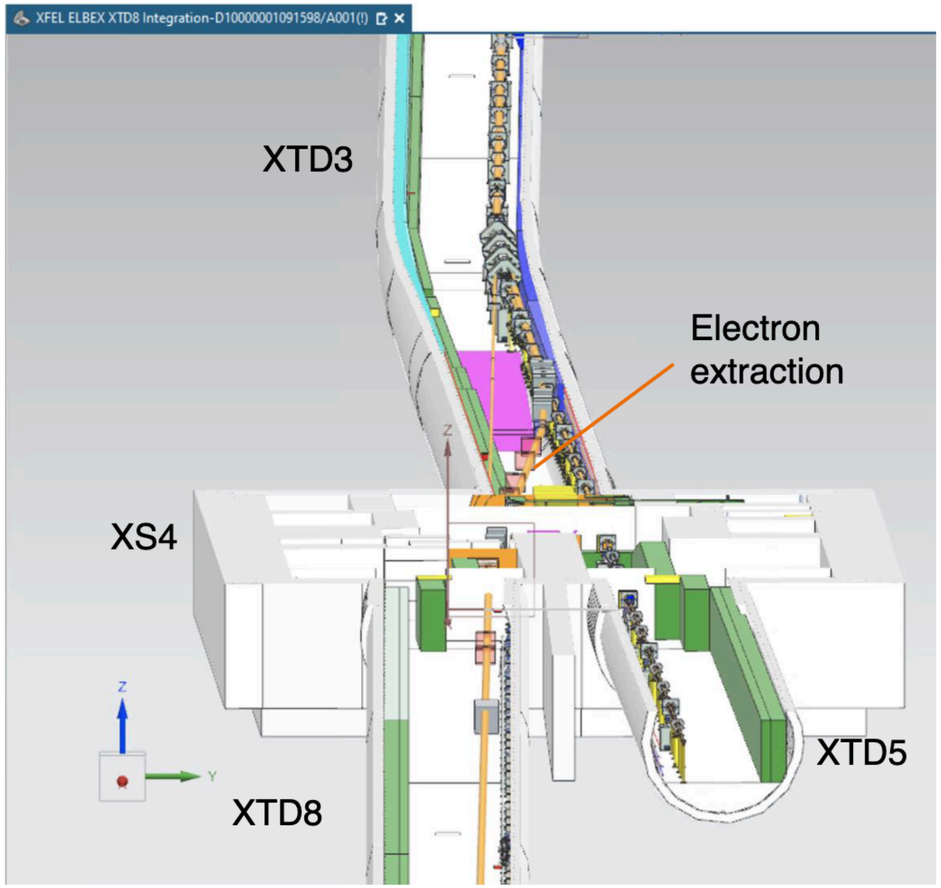
ELBEX project

W. Decking,
B. List

Extraction concept in the XTD3 Tunnel

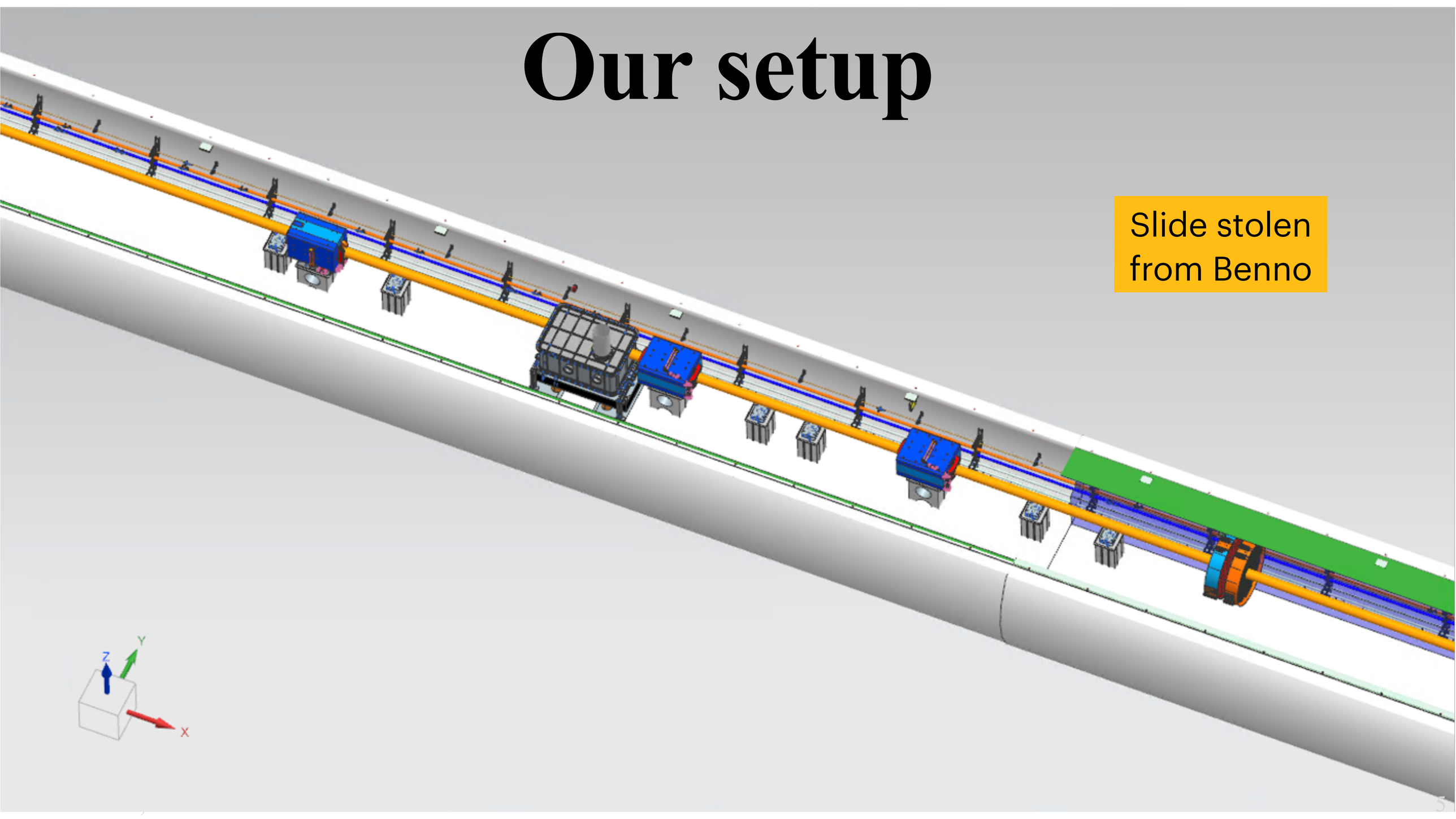
Slide stolen from Ruth



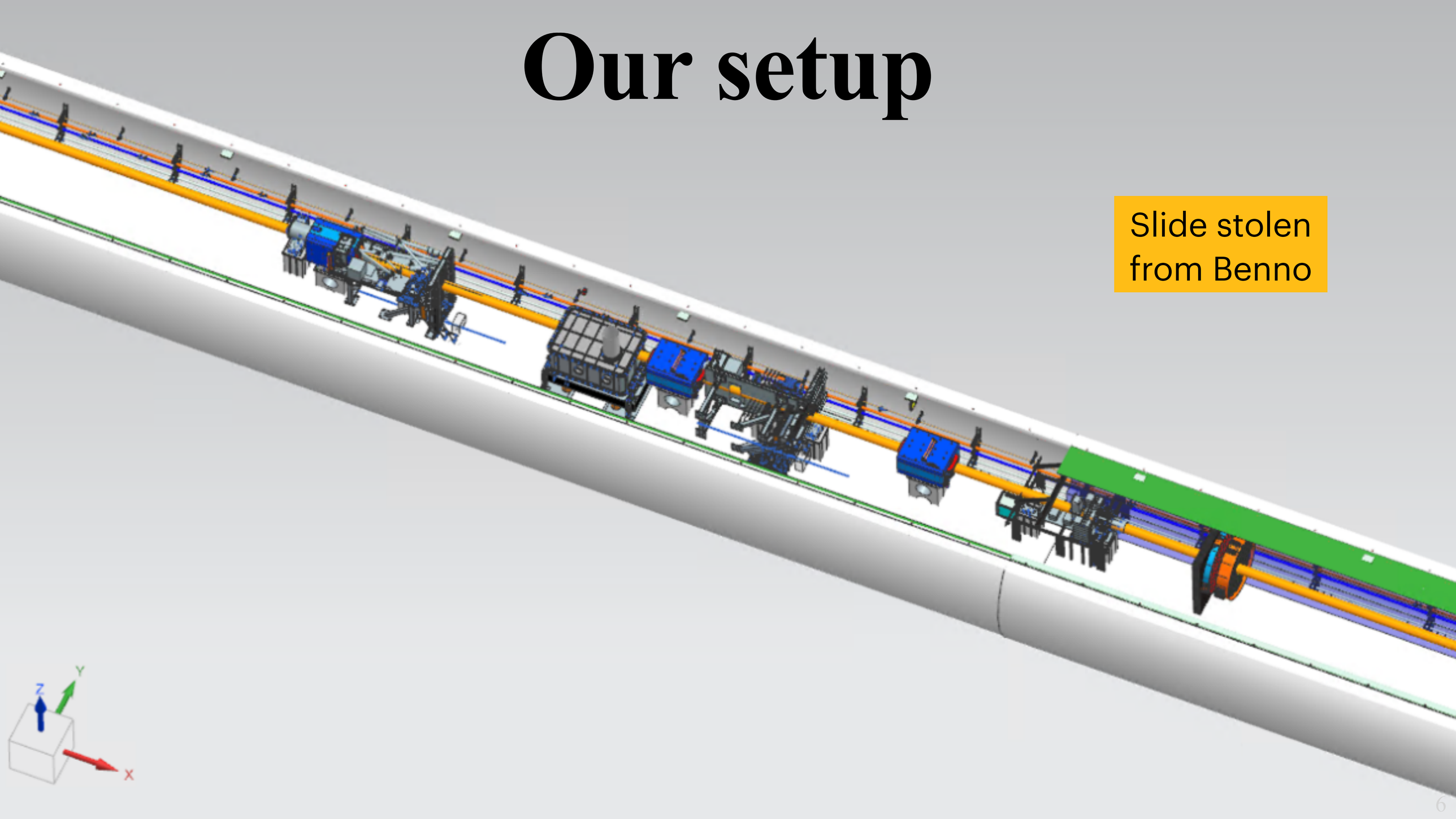


First concept of double-bend ELBEX extraction beamline, to be optimized

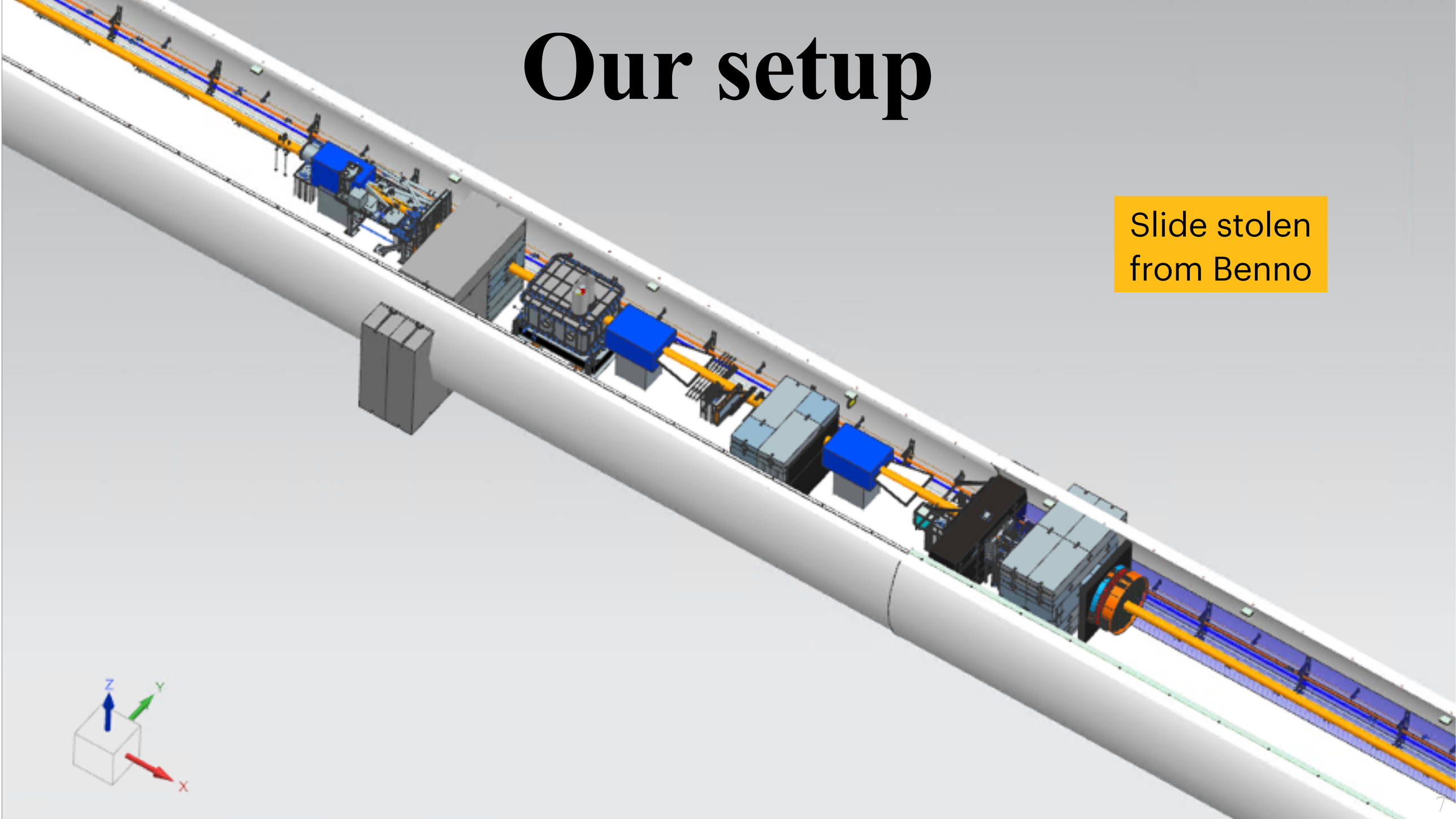
Our setup



Our setup



Our setup



Slide stolen from Benno

How to proceed?

- Sasha has the full CAD already
  - Benno and Louis are adding the final focusing section
  - This will cut ~10-15 m longitudinally

- 1st order: focus on the physics acceptance (i.e. no backgrounds, radiation, etc.)
  - naively assume that everything stays the same
  - play around with the spacing
  - conceptually try out also different (smaller, weaker) magnets

} **How to streamline?**

- 2nd order: fine tuning of the setup
  - Change to more realistic shielding, add shielded readout crates, etc.
  - Check if there are changes needed to the sub-systems
- 3rd order: run full scale GEANT+FLUKA simulation for initial radiation estimates ⟶ **when?**
  - Send to XFEL/DESY officials, get feedback and continue fine tuning