

# Some questions on polarimetry to address in view of a CDR

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# Introduction

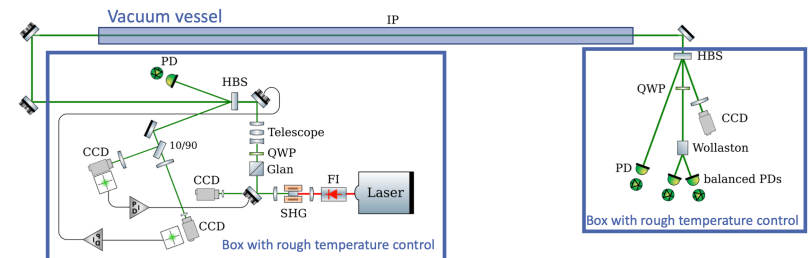
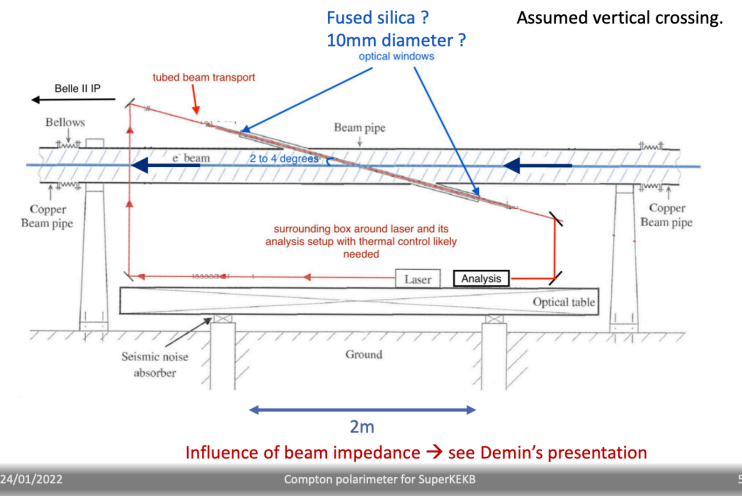
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- Discuss longitudinal polarimeter, presentation made last week on the possibilities on the T-pol
- Try to show current open points (in my opinion), please feel free to suggest more

# Laser and related integration

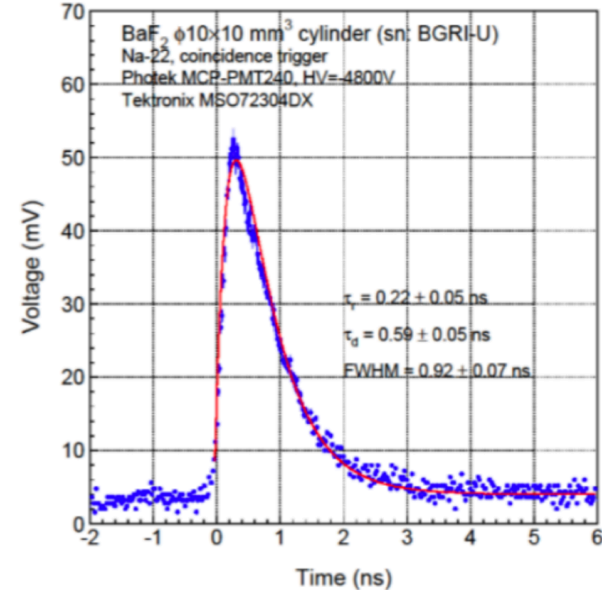
- Vacuum chamber: some concept exist and has been validated for impedance
  - Need some 3D model of the chamber
  - need SuperKEKB experts involved
- Laser: schematics can be reviewed and improved further
  - preliminary drawing of laser table (underneath beam) + periscope is needed
- Laser synchro to RF
  - need a contact
- Guess of laser hardware cost ~250k€ including laser table but excluding beam pipe
- Need also involvement of SuperKEKB team for utilities (mainly cables)

## Beam pipe for interaction chamber

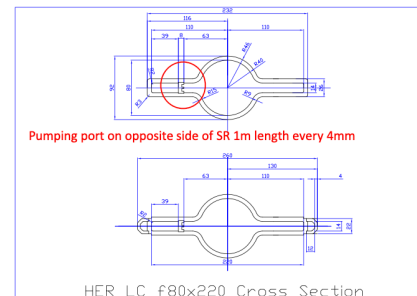


# Photon detector

- Concept of detector based on BaF2 exists but requires experimental validation
  - backup solution consist in integrating over several bunches and use PbWO2 instead
  - still conceptual electronics design must be drawn
- Main integration issue:
  - requires to modify a magnet, a redesign with change of open side needed
    - expensive
    - no impact on lattice itself
  - Beam pipe for photon window need to be drawn



## Gamma-beam detector



Magnet modifications are required to let gamma beam go through...

Need to have a ~25mm diameter window to let the gamma beam go through on one side (assumed compton IP 12m upstream)  
 → Size can be reduced by reducing distance to compton IP  
 → Material and thickness to be discussed

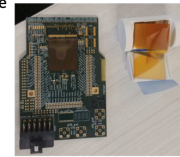


# Electron detector

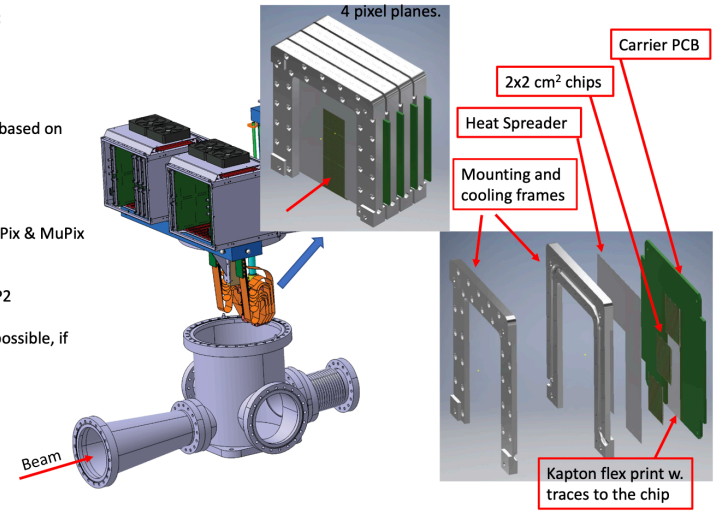
- Currently prototyping phase
- Open points:
  - number of planes, pixel sizes, number of chips/plane
  - Study of impact of Quad in beam line on electrons trajectory extrapolation
- Integration:
  - model needed for impedance check
  - Required modifications to beam pipe ? (ensure electrons do not hit material)

## Position Sensitive Detector Design:

- 4 pixel detector planes
- HVMAP pixel detectors
- 3  $2 \times 2 \text{ cm}^2$  chips per plane (TBD based on profile)
- $80 \times 80 \mu\text{m}$  pixels
- Original chip design based on ATLASpix & MuPix (designed at KIT, Heidelberg, Mainz)
- Specific modifications for MOLLER/P2
- Specific ChiralBelle mods probably possible, if need be

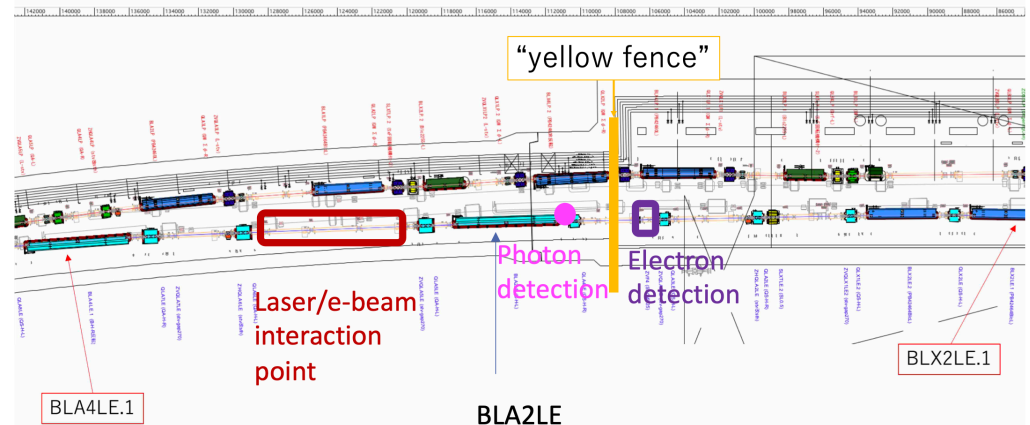


2022-10-05



Michael Gericke, Compton HVMAPS update, Belle II Collaboration Meeting

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# Polarimeter performance

- Some detailed simulations for photon detector
  - Need to be reviewed with up-to-date location and beam parameters in a consistent picture with lattice modified by Yuhao
- Not so much for electron detector (AFAIK)
  - Maybe useful now to help design electron detector and assess performance
  - Transverse polarimetry need to be studied to some extent also with same polarimeter location