PAUL SCHERRER INSTITUT

PSI

'Εστία

Estia

ess EUROPEAN SPALLATION SOURCE

Artur Glavic :: Paul Scherrer Institut

DMSC Estia Specific Requirements

Reflectometry Software Requirements Meeting – 21.02. 2017

Estia timeline

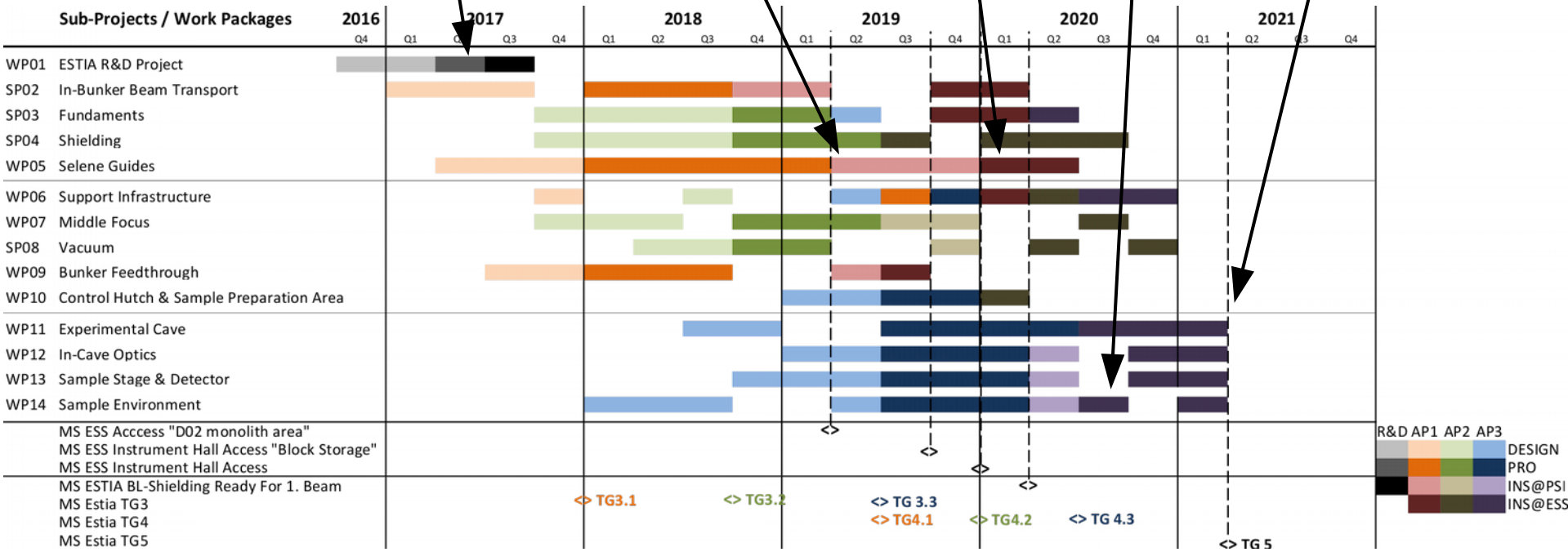
Test of Selene guide adjustment

Need Selene alignment

Start hot commissioning

First components controlled

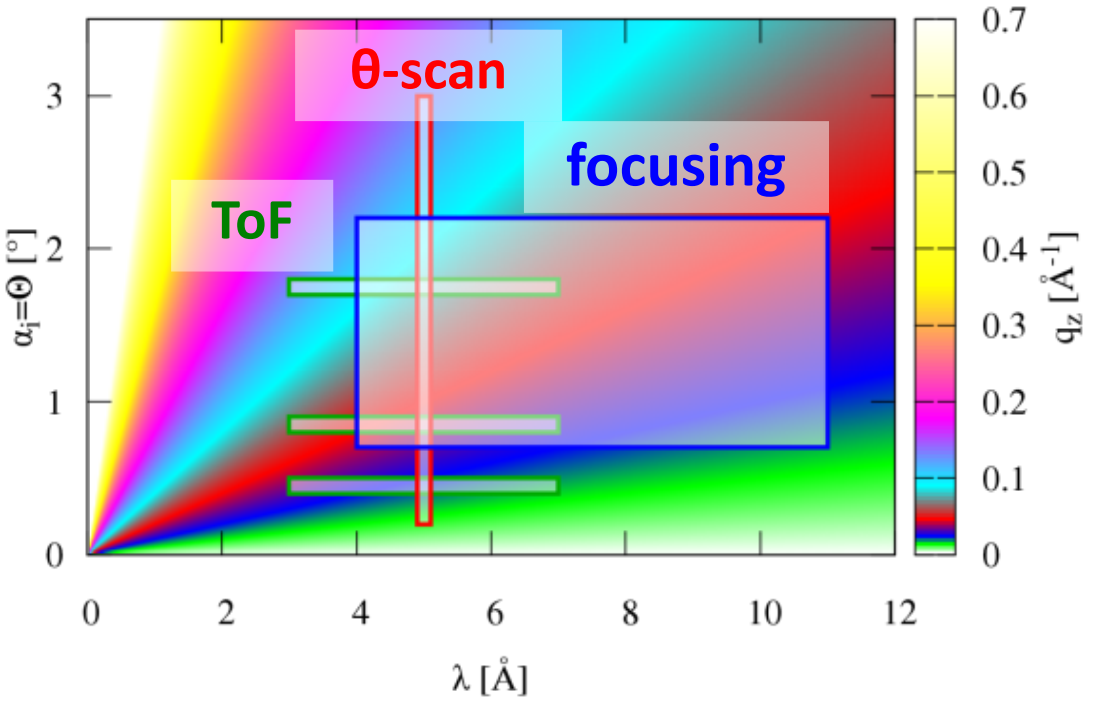
Control of SEE and stages



Outline

- **High intensity specular reflectivity**
- **Selene guide adjustment**
- **Polarization analysis integration**
- **Sample alignment laser system**

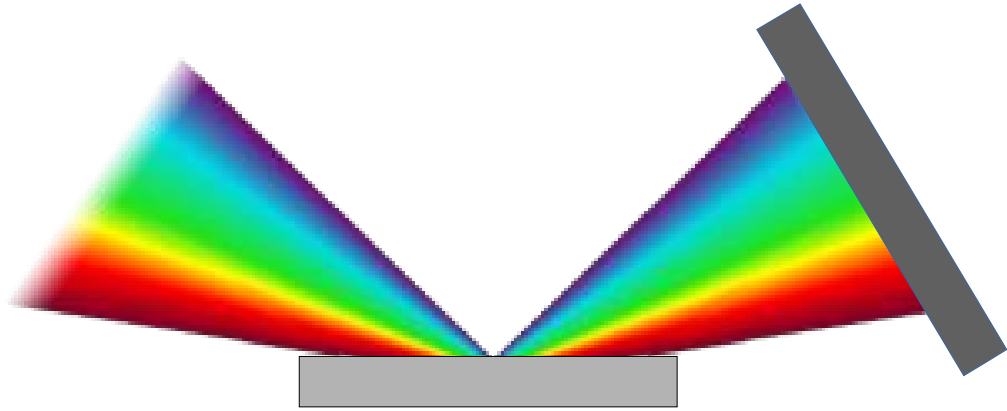
High intensity specular reflectivity



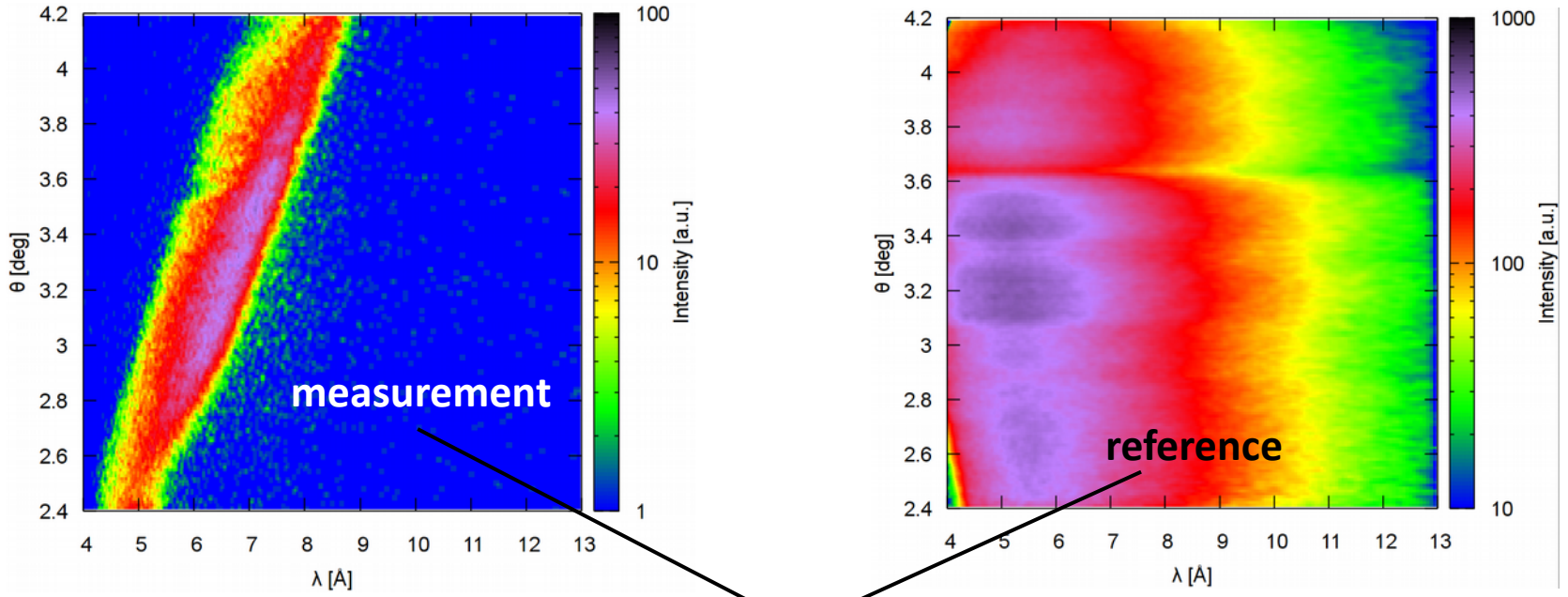
- **Divergen beam on sample**
- **Determine reflection angle with PSD**
- **Ignore off-specular scattering**

=> Very high gain in signal

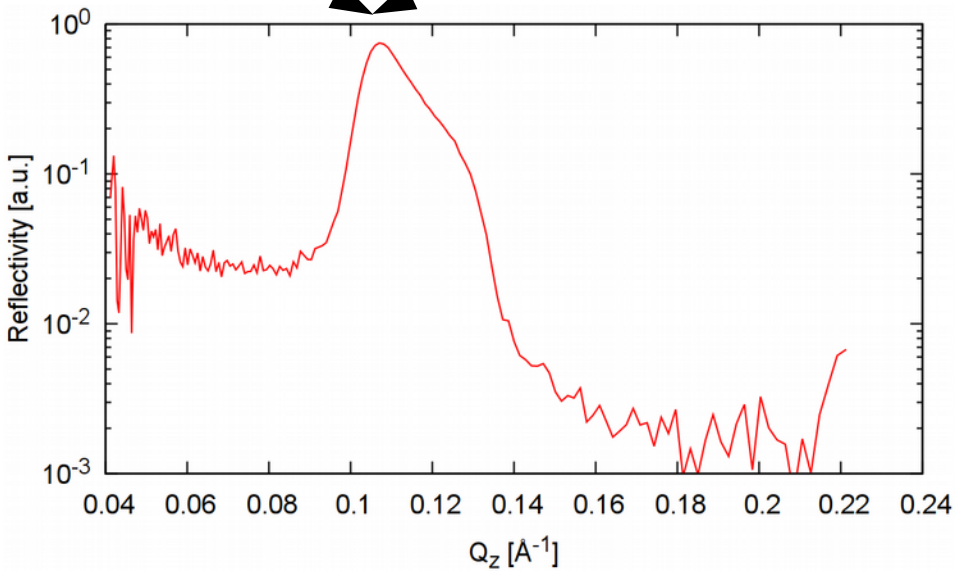
- **Necessitate careful analysis and λ+θ dependent normalization**



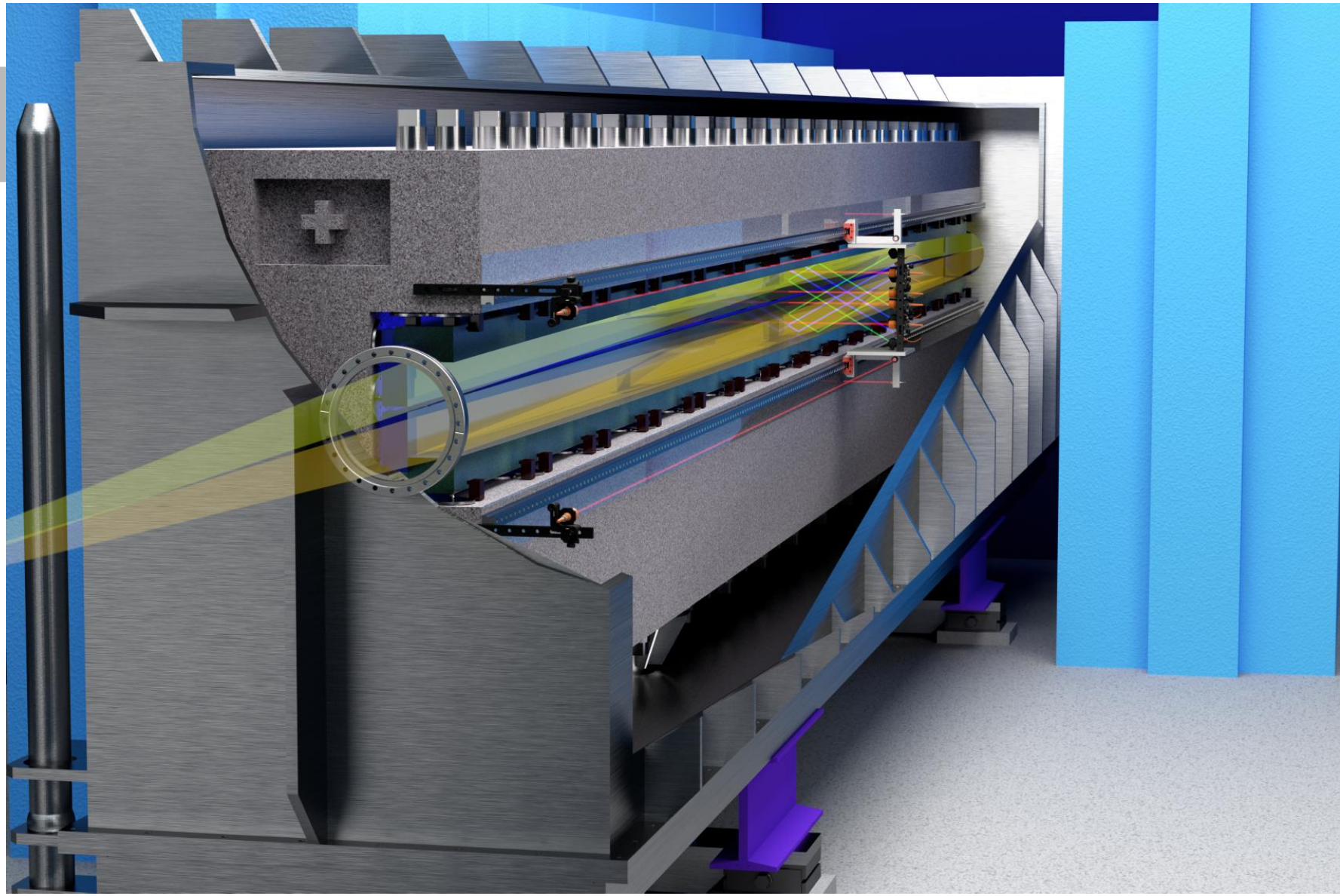
High intensity specular reflectivity



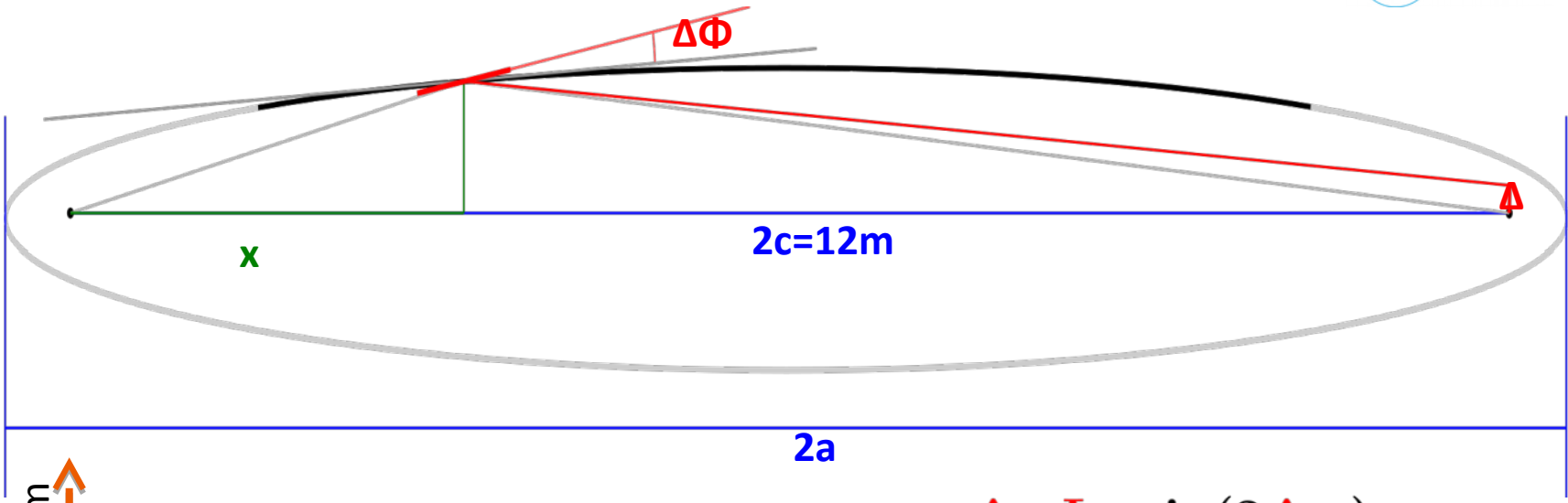
Script versions implemented at PSI (amor_reducer/ eos.py)

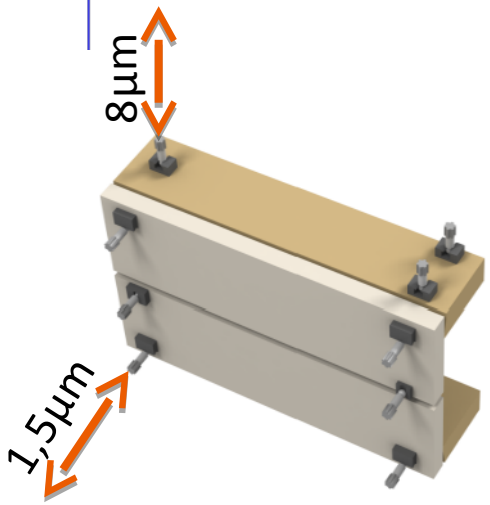


Selene guide adjustment



Selene guide adjustment





$$\Delta = L \cdot \sin(2\Delta\varphi)$$

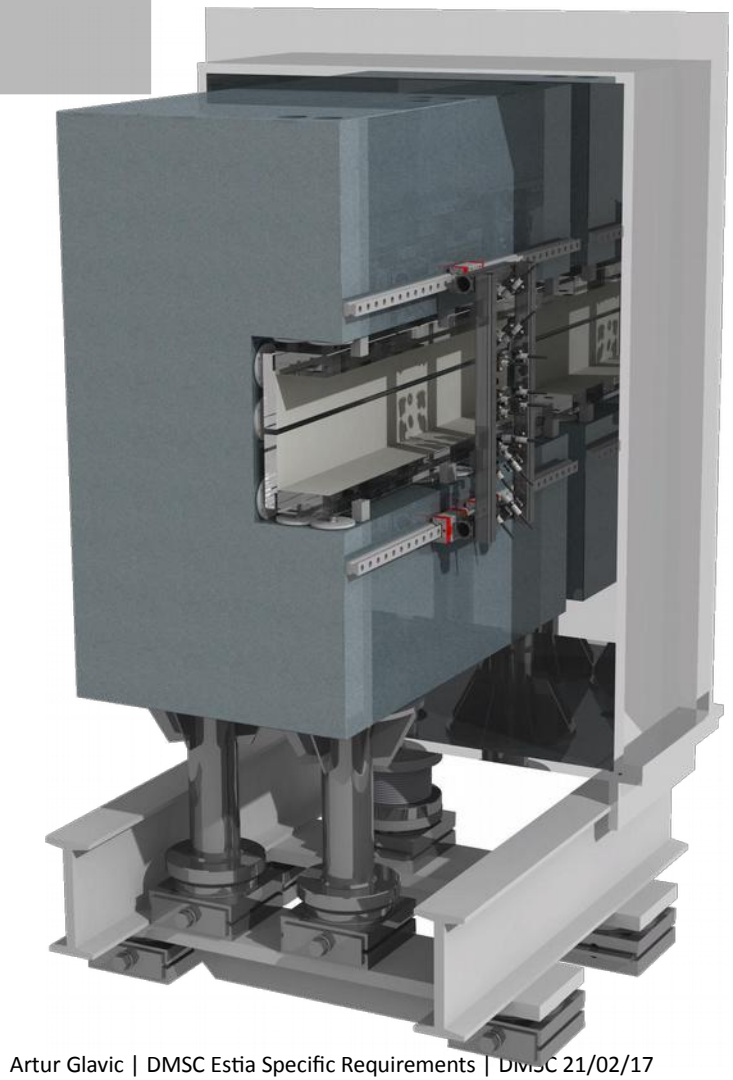
$$L = a(2 - x/c)$$

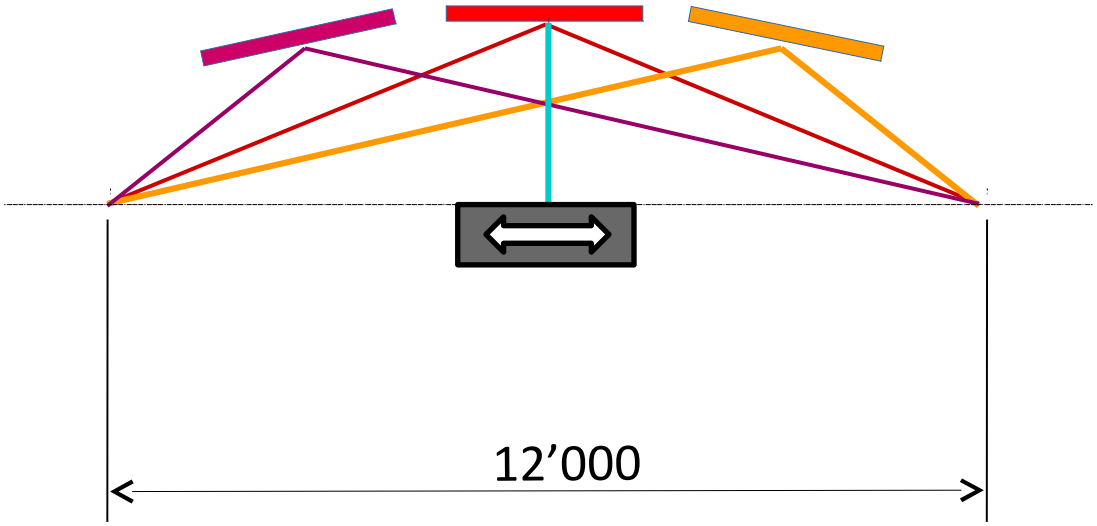
based on 3 mm x 1 mm footprint at 1.0°

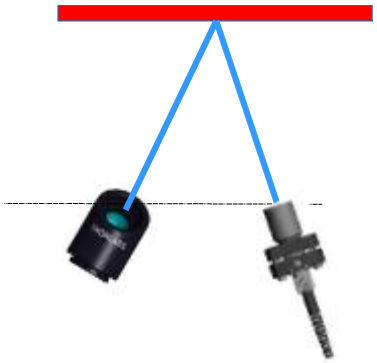
(Δ_x=60 µm / Δ_z=1 mm)

	$\Delta\varphi_V$	$\Delta\psi_V$	$\Delta\varphi_H$	$\Delta\psi_H$
Angular accuracy [µrad]	3	3000	50	200
Holder accuracy [µm]	1.5	>50	25	8

Selene guide adjustment





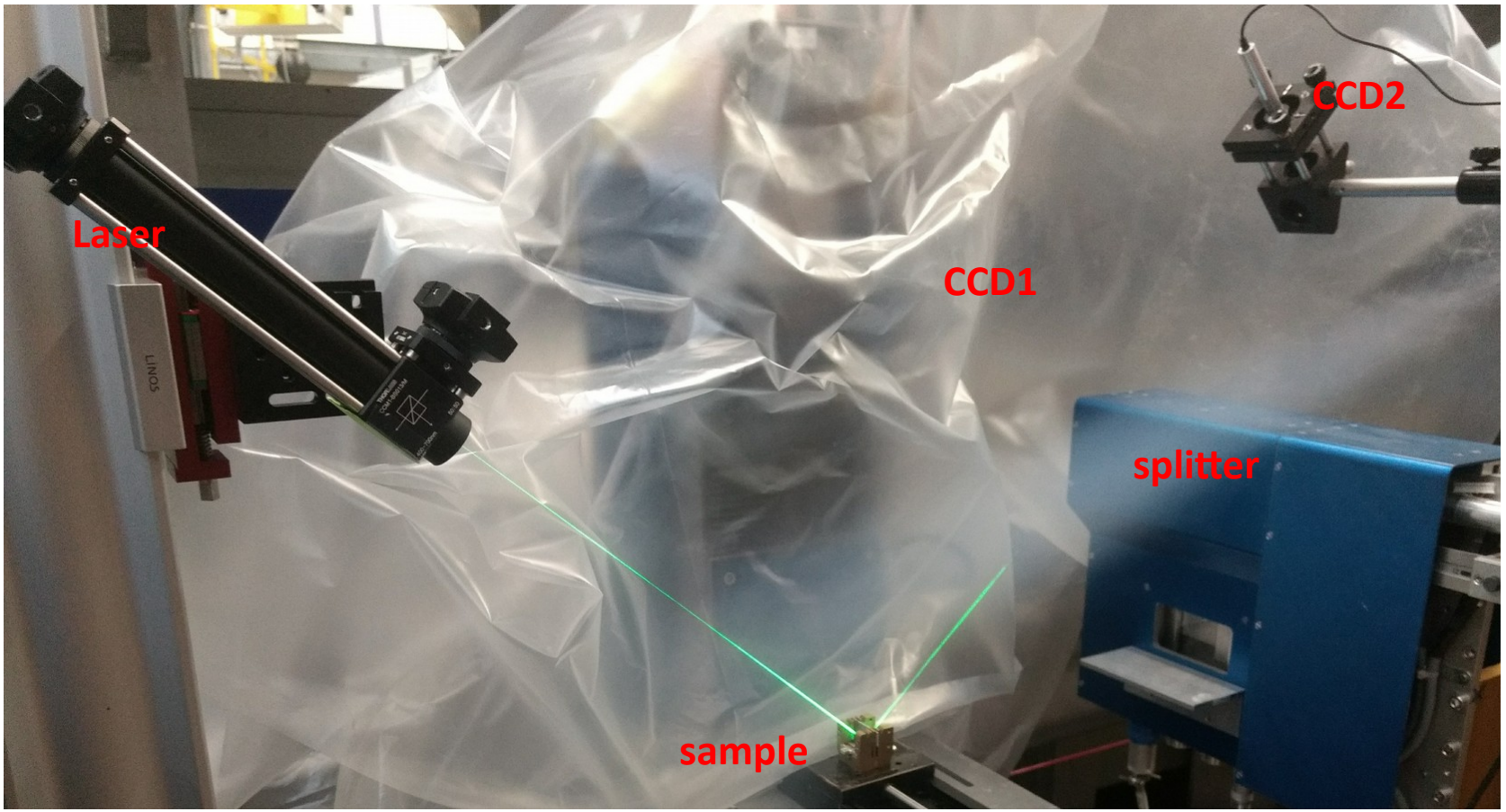


Polarization analysis integration

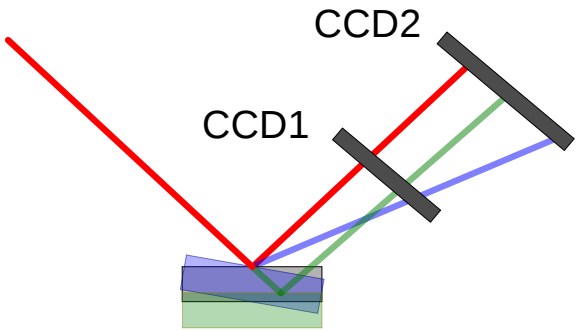
Polarized experiments will be standard on Estia, this necessitates integration in all software:

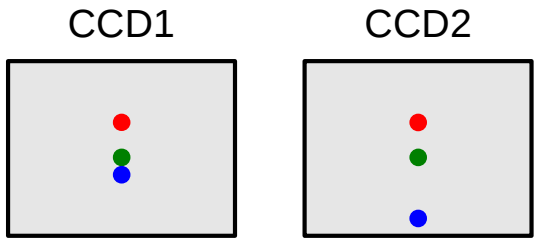
- **Live display needs to show all spin channels for comparison**
- **Automatic switching between spin-states during run is a must**
- **Data reduction needs to be aware of states and apply corrections accordingly (e.g. same scaling for all states)**
- **Polarization measurement and optimization should be part of the control software**
- **Events must be correctly allocated to spin-states (neutron at flipper before or after hitting the sample)**
- **Correction by known polarization efficiency would be nice**

Sample alignment laser

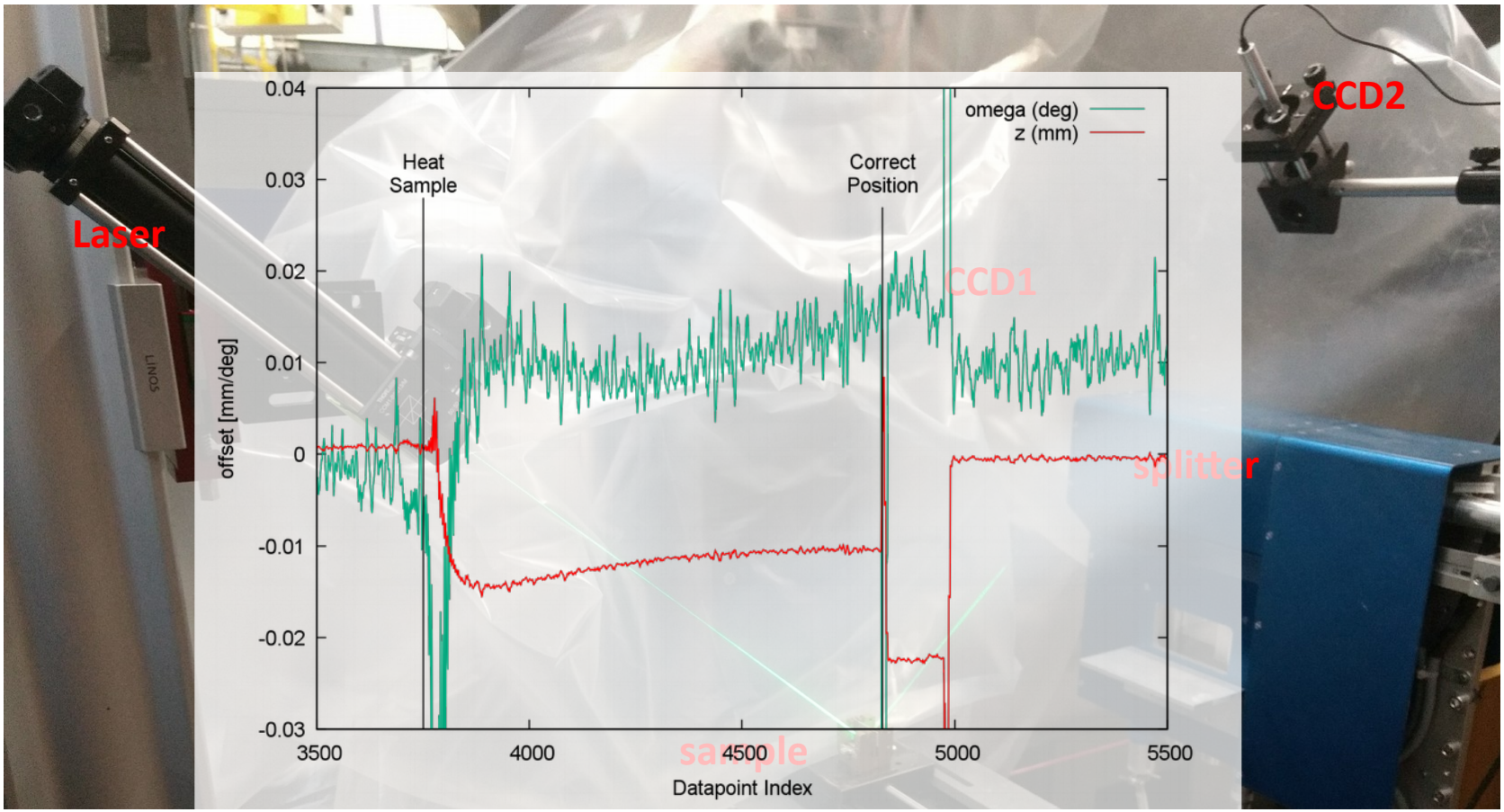


Geometric reconstruction of sample surface position and angle

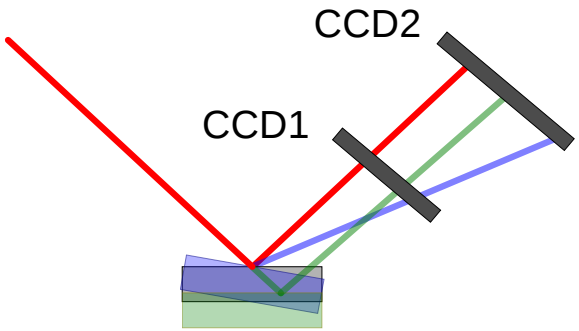


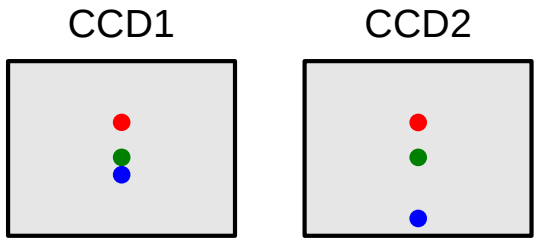


Sample alignment laser



Geometric reconstruction of sample surface position and angle





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Thank you for your attention!