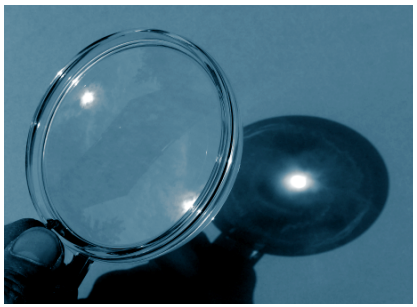
Paul Scherrer Institut
Switzerland
Jochen Stahn

Estia

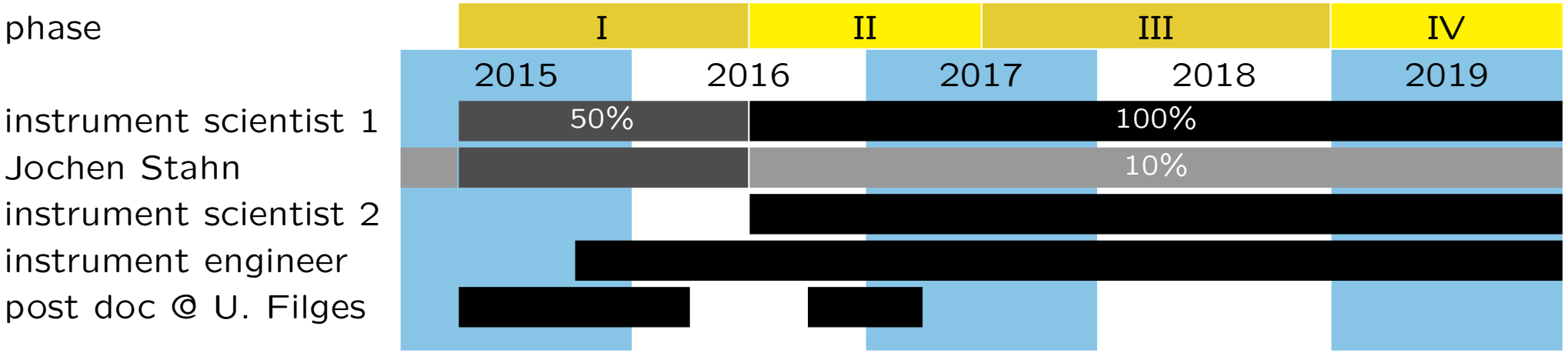
a polarised focusing reflectometer for small samples



- selected by the ESS to start 01. 2015
- just got *green light* to recruit staff

lead instrument scientist
instrument engineer
post-doc (McStas & MCNPX)

- start of phase 1 in Q2 2015
- estimated work-plan & staff



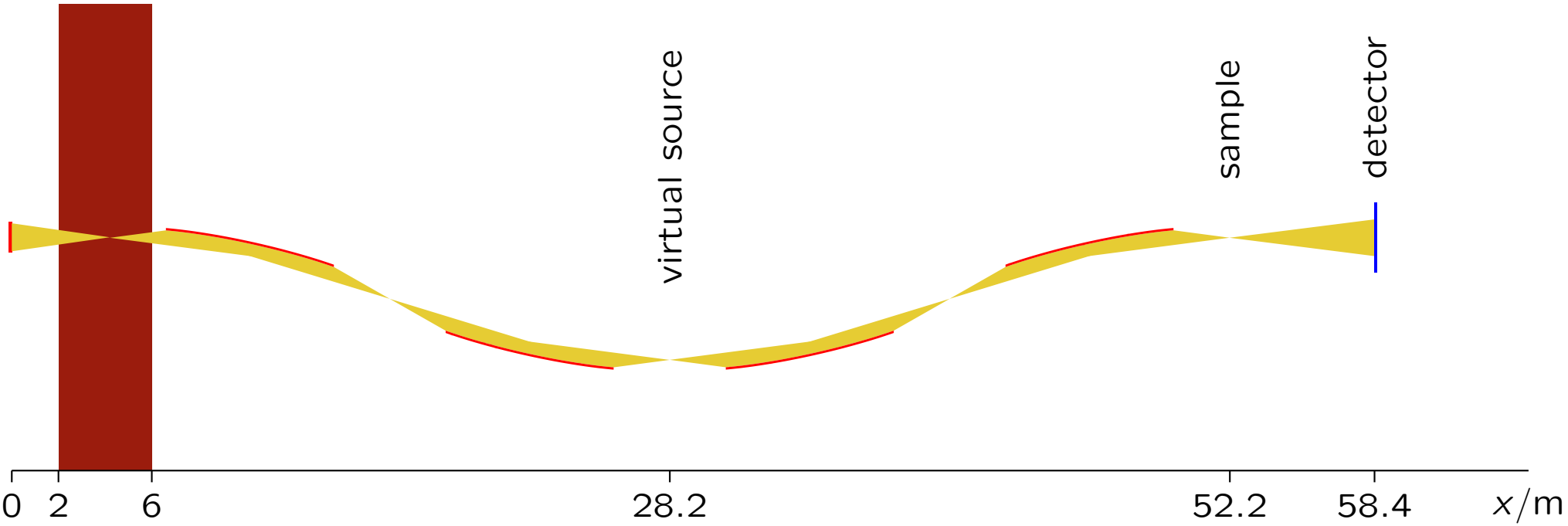
- cost category *A*
  i.e. 9 M€ instead of 12 M€ as in the proposal
  unclear situation because of the drop of the € relative to CHF

- pin hole in beam extraction
- 2 *Selene* guides
- avoid prompt pulse

$\Rightarrow \lambda \in [5, 10]$ Å

$\Rightarrow$ length ≈ 60 m

- incompatible with pan-cake moderator
- low transmission due to 8 reflections
- very good shielding

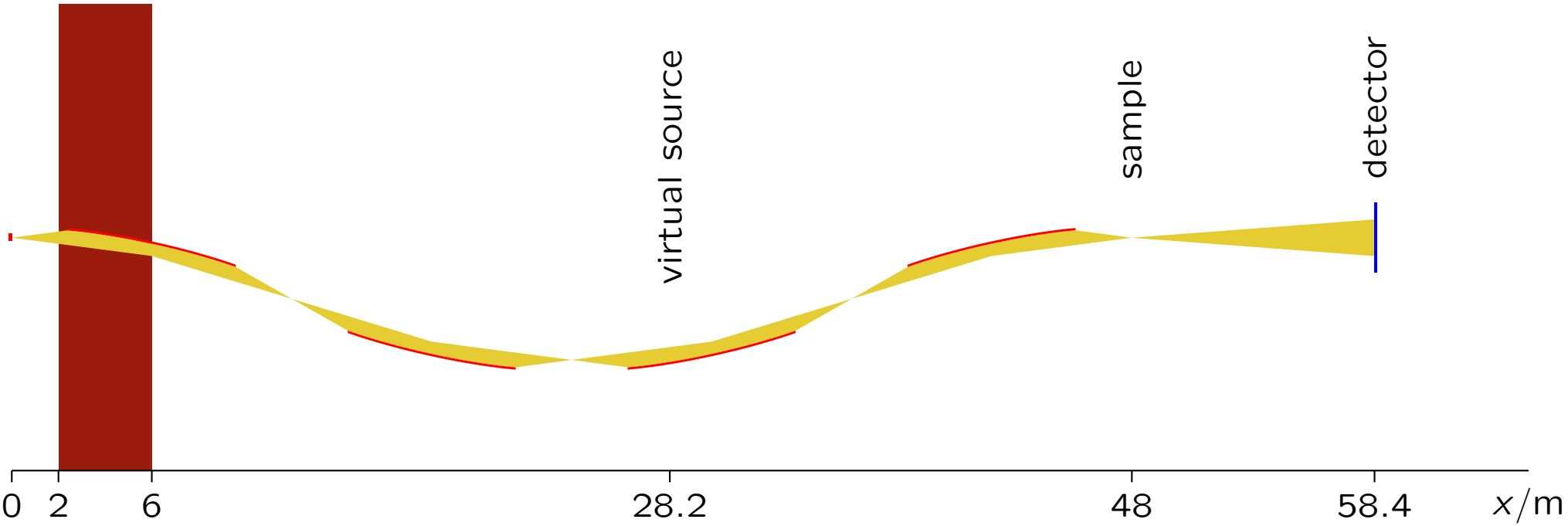


- focus on pan-cake moderator
- 2 *Selene* guides
- avoid prompt pulse

$\Rightarrow \lambda \in [5, 10]$ Å

$\Rightarrow$ length ≈ 60 m

- low transmission due to 8 reflections
- good shielding



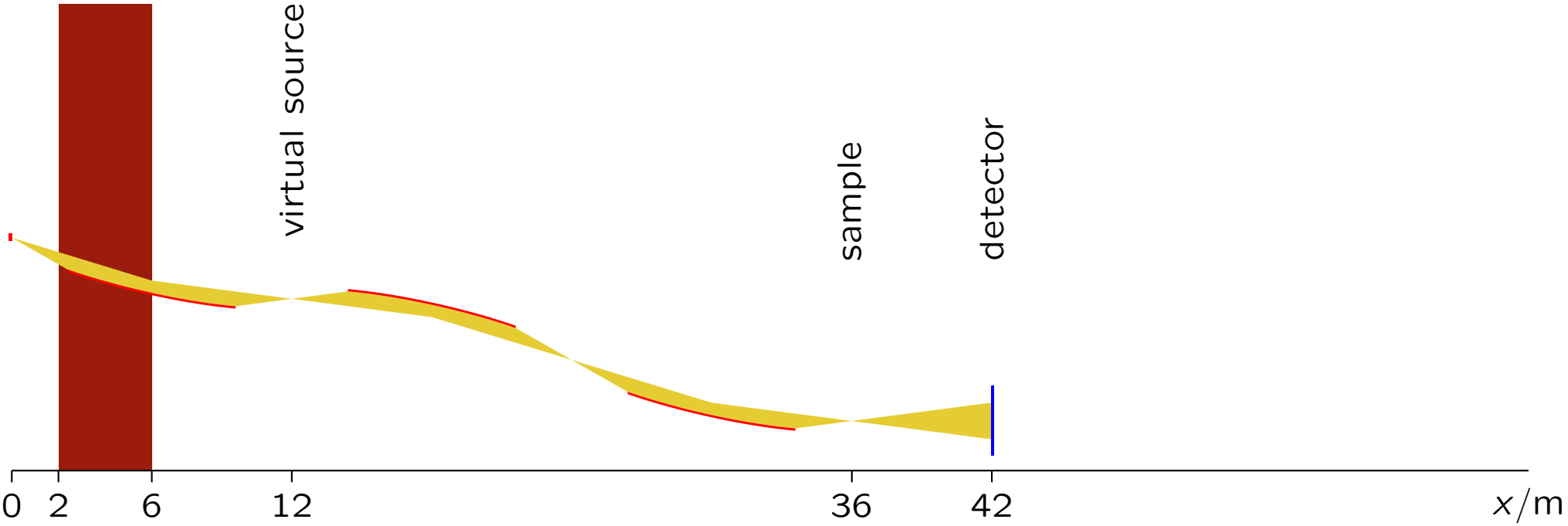
- focus on pan-cake moderator
- feeder + *Selene* guide

⇒ 6 reflections

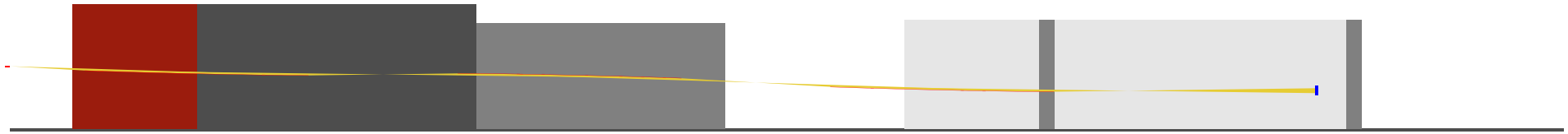
⇒ $\lambda \in [4, 10]$ Å

⇒ length ≈ 40 m

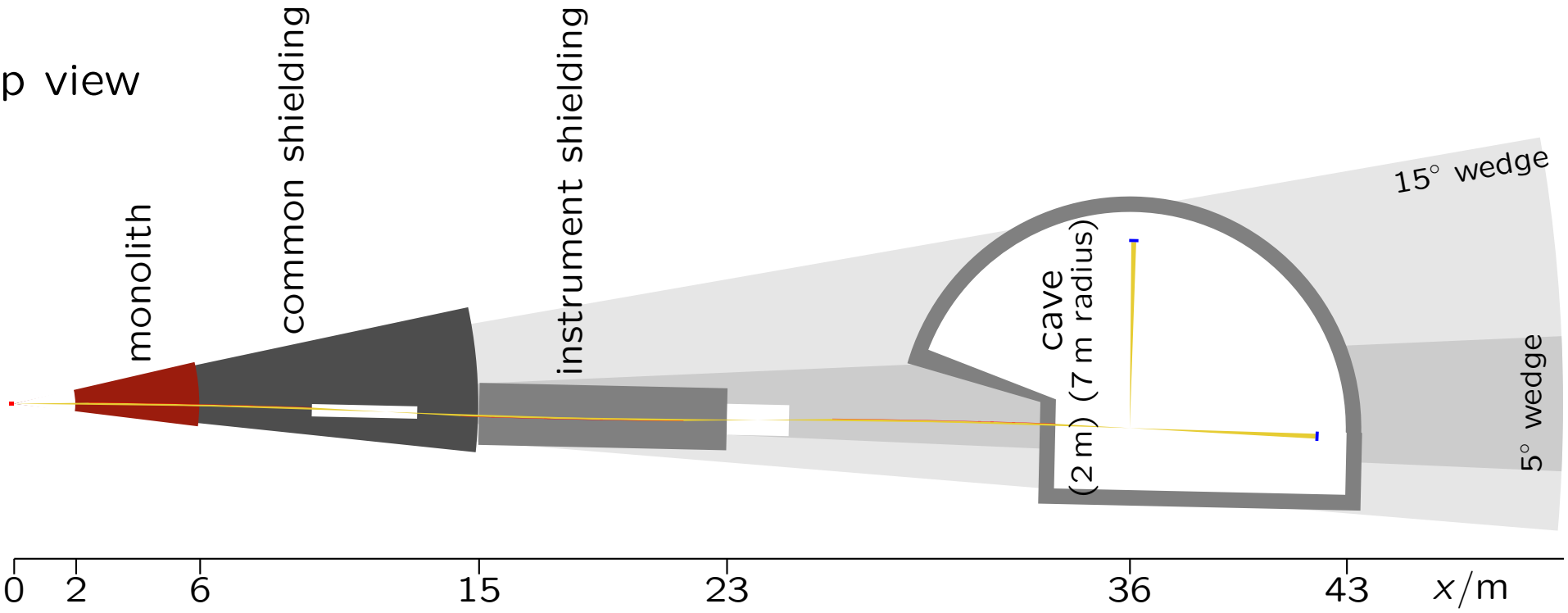
- higher transmission
- wider q-range
- feeder within monolith
- less shielding
- prompt pulse not excluded



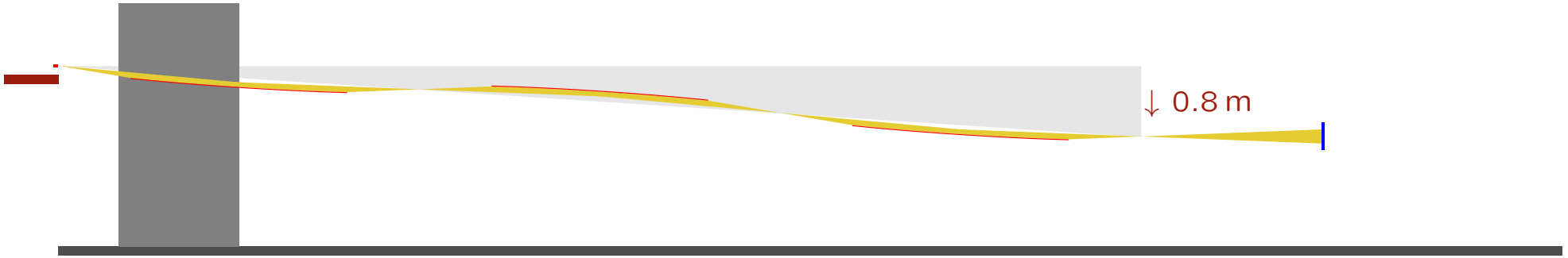
side view



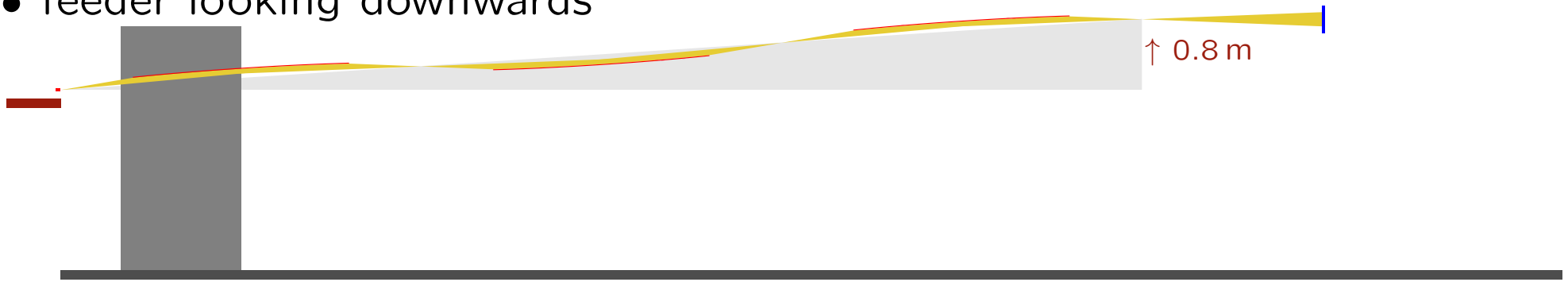
top view



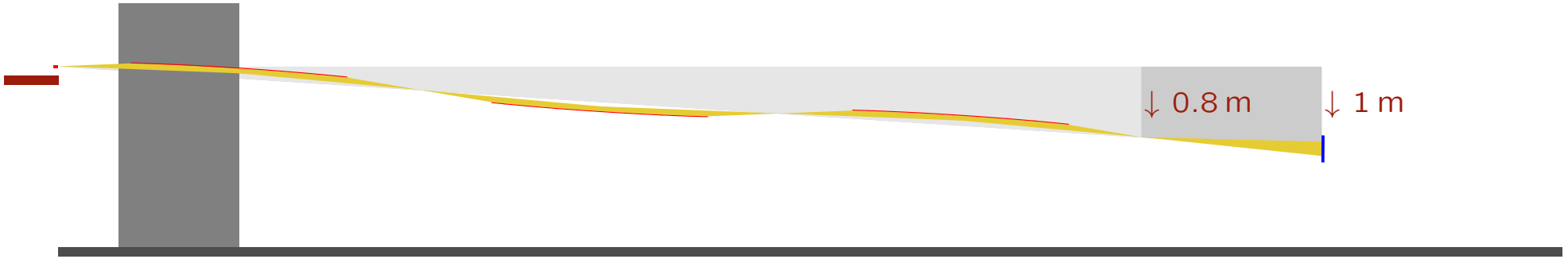
- feeder looking upwards



- feeder looking downwards



- horizontal beam extraction



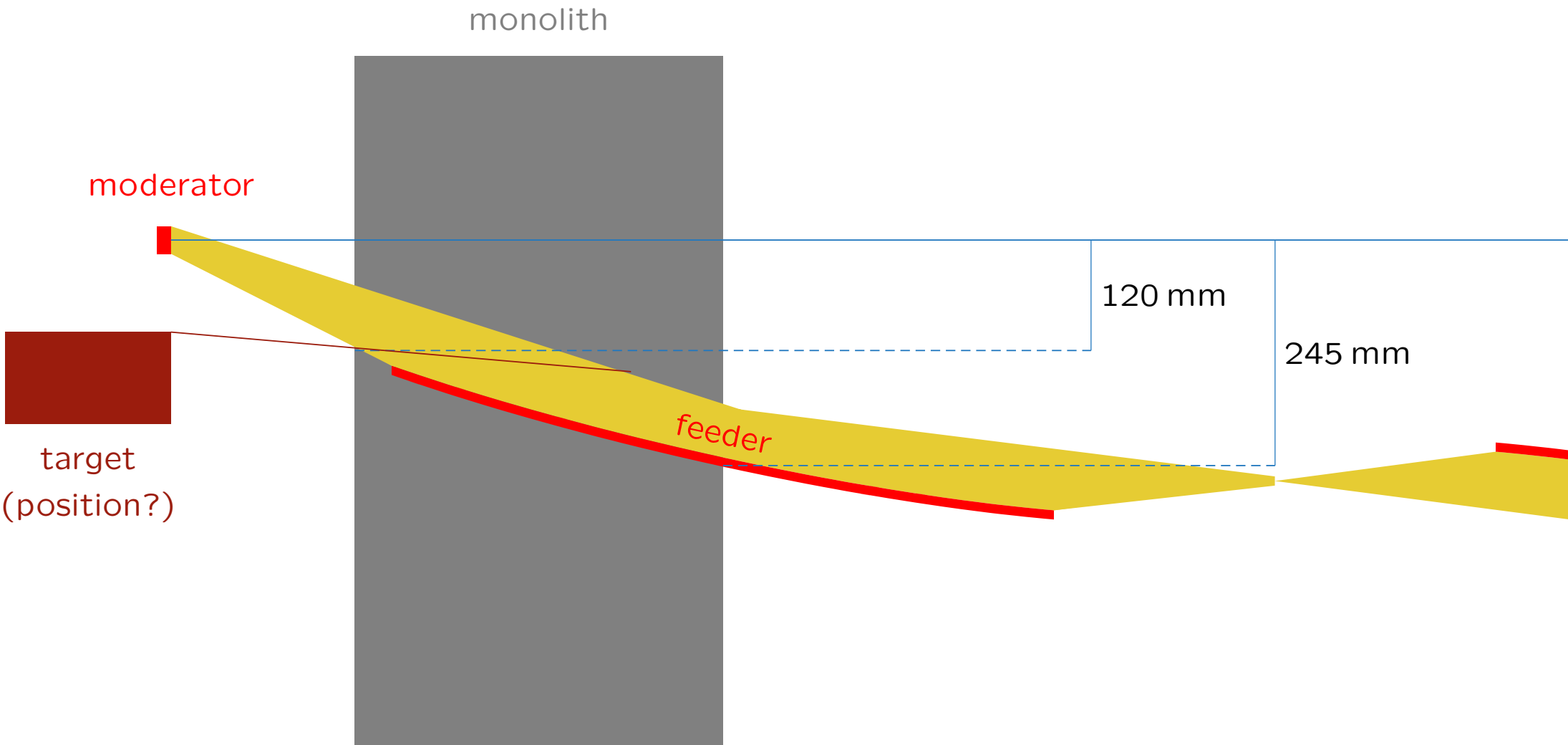
- feeder looking upwards

- feeder looking downwards

- horizontal beam extraction

insert geometry

- vertically asymmetric
- *free* space: min 300 mm below (above) moderator height

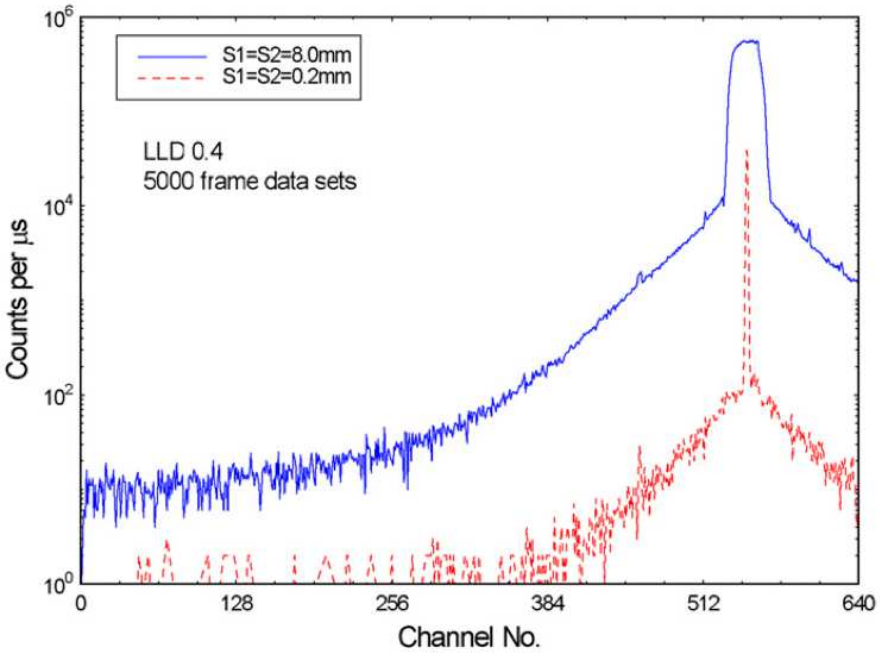


scanning aperture

- various technical solutions (voice coil, linear drive, . . .)
- speed is no problem, but acceleration is!

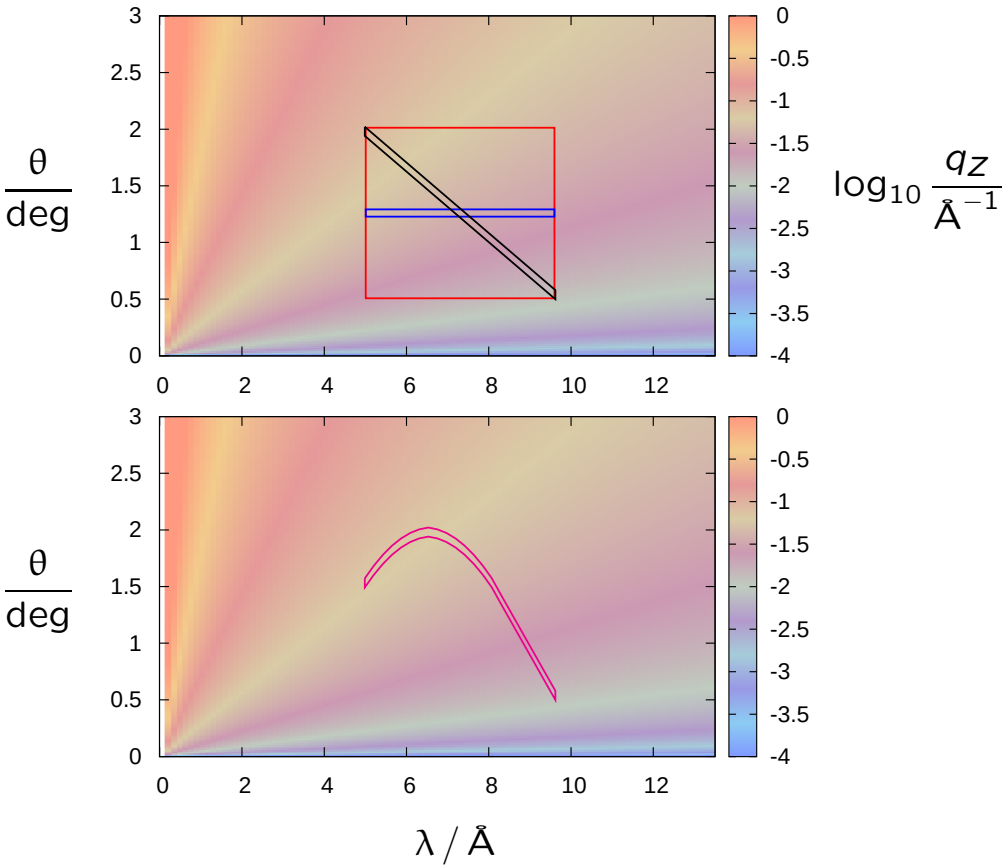
detector

- intrinsic background caused by alu window (see Amor, Osmond)



importance of options (ESS wants to save money....)

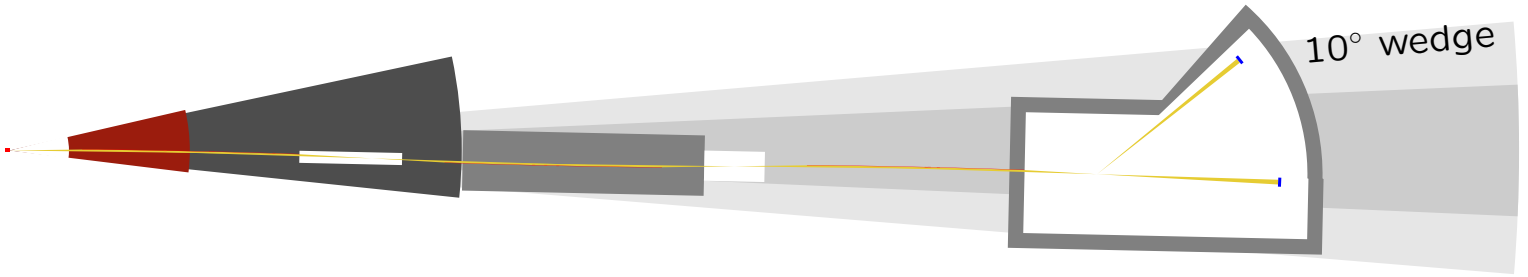
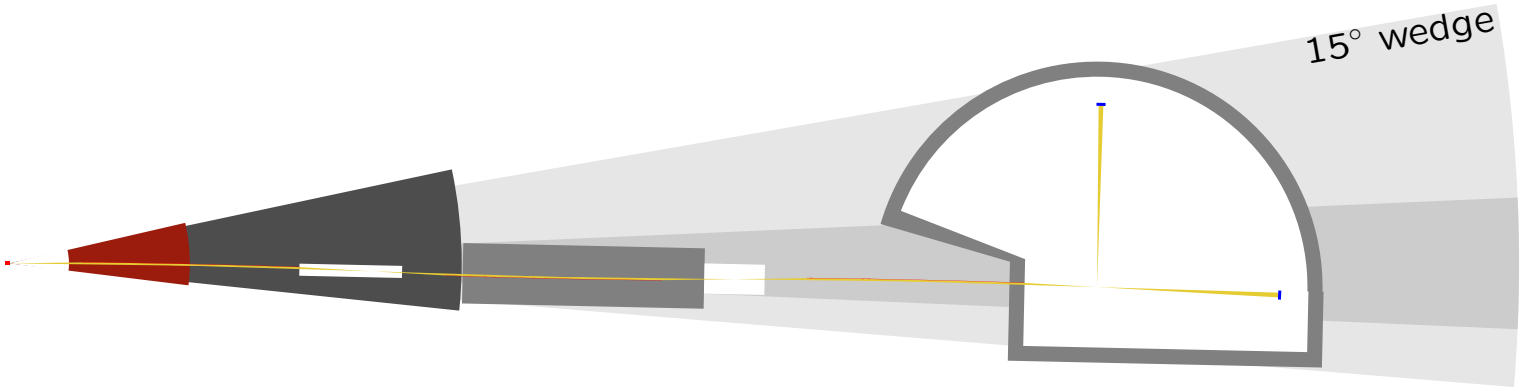
- scanning aperture
  - λ-θ-encoding
  - wide q_z-range
  - reduction of measurement time



- spin analysis
- GISANS
- spin-echo set-up
- λ-θ-encoding with a multilayer (dispersive virtual source)

q_z-range (2θ-range)

- spatial constraints

q_z	2θ	wedge
1 Å^{-1}	37°	10° 
2 Å^{-1}	80°	15° 

length

- old design (focusing to moderator) vs. new design (feeder + *Selene*)

feeder

- *Selene* type looking downwards / upwards
- inclined beamline
- *Selene* with a roll of 45°
- other type

options

- rating (must, should, nice to have)
- ranking

q_z-range

- arguments for high / very high q_z