Role of the monolith-optics interface in the overall optics and shielding strategy

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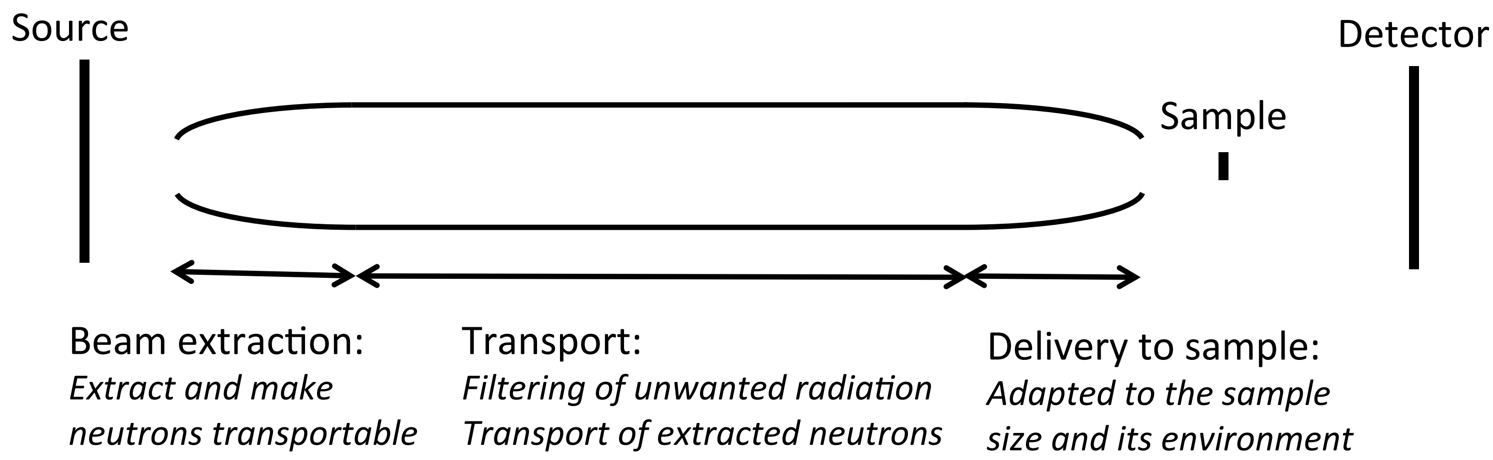
Outlook

- Introduction
  - Optics strategy
  - Shielding strategy
- Requirements
  - Geometry
  - Optical properties
  - Shielding properties
  - Serviceability
- Tasks for the meeting important from optics and shielding point of view

Introduction: Optics strategy



Beam extraction, of course, will be placed inside the monolith and therefore the guide segments inside need to fulfill their function.

Introduction: Shielding strategy

- The common shielding bunker concept is an open bunker:
  - Reduces albedo scattering
  - Increases accessibility of other components
- Two important points to consider:
  - Collimation of the direct view in the monolith
  - Optics and other elements in the bunker should be as transparent to high energy neutrons as possible

Requirements

- It is very important to ensure that beam extraction works properly under the extreme conditions inside the monolith (high radiation, high temperatures and high temperature gradients)
- **Shape:**
  - Guide segments should stay where they are (keep aligned with both beam on and off)
  - Guide segments should not deform with temperature changes

Requirements

- **Optical properties:**
  - Coating does not degrade at the operating temperature (lower than diffusion temperature)
  - Substrate must have low radiation damage
- **Shielding properties:**
  - Substrate can help to direct view collimation
- **Serviceability:**
  - Guides must be safe to manipulate in case of insert change or upgrade (activation)

Tasks

- Evaluate different substrates in:
  - Radiation damage
  - Heat load
  - Thermal expansion
  - Activation
  - Direct view collimation
  - Price
  - Manufacturing issues

Tasks

- Discuss on insert design:
    - Alignment
    - Cooling
    - Installation
- Discuss on substitution and upgrade of insert:
    - Activation of all elements

Compliance matrix

Substrate	Heat load	Thermal expansion	Activation	Shielding	Price	Manufacture	Radiation damage
Al	Lowest	23×10^{-6} K^{-1}			1500 $/Ton		Low (?)
Steel	like Cu	12×10^{-6} K^{-1}			300 $/Ton		Low (?)
Cu	Highest	17×10^{-6} K^{-1}			4000 $/Ton		Low (?)
Borofloat	like Cu	3×10^{-6} K^{-1}					High (?)