# Closeout: Cost Optimisation of Beamline Shielding Workshop

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# Higher Level Conclusions

- Lots of tasks for ESS to follow up (separate document)
- Much of this work is very impressive, and it is clear that there has been a lot of progress since the last time we looked at this.
- Some scope for similar approaches:
  - CSPEC, MIRACLES
  - VESPA, DREAM
- Many of the outstanding struggles are based on trying to make the geometrically restricted, long pulse source competitive with other facilities.

# Scope Setting Procedure

- Approved procedure from discussions with Andreas on Thursday
  - Use the costings from P Bentley presentation slides 4,5
  - Add chopper pits, cave shielding to protect from gamma of white beam dump on beam axis (all neutrons convert to MeV gamma)
  - The shielding is free up to the exit plane on the bunker surface
  - Add the items from the following page
- The tables of values from slides 4,5 will be updated if necessary as new results come in
- Any other relevant opportunities from LOKI, NMX will be shared where appropriate

# Scope Setting Procedure pt 2

- The following are current recommended cost estimates for additional straight beam components:
  - PPS or T0 chopper: 750 kEuro each (ESS chopper group, 2013)
  - Heavy shutter: 750 kEuro each (ESS engineering group, 2013)
- These are both out of date, and will be updated at the beginning of June 2016.

# Homework!

# ESS

- Phil Bentley — Meeting on PSS with Stuart Birch, Gunter Muhrer, Monika Hartl
- Ken Andersen to examine guidelines for floor space in guide hall.
- Phil Bentley to make sure contact corrosion between metals and between concrete and metal is in the handbook.
- Phil Bentley to make available detail cost lists of caves etc, particularly to Werner Schweika.
- Marton Marko to send calculations of misalignment and waviness on brilliance transfer to Ken. Phil to give VITESSE-code (Damian, Caroline) to Marton.

# ESS — Continued

- Ken & Damian check reliability of moderator brightness at interface between cold and thermal source — particularly for (BEER).
- Gabor: define an action plan to answer the question of whether heavy shutters should be standardized across all beamports in the bunker wall — is this a good idea? Maybe just for short instruments?
- Phil: organise a staffing meeting with Oliver and other management representatives about support levels for optics.
- Monika Hartl to find out if roof on instrument is required for zoning, skyshine etc.
- Phil and Ken: talk to the DREAM team about the choice of guide substrate inside the bunker.
- Ken: strategy for the lower and upper moderator must be defined urgently and communicated to the instrument teams
- Phil to escalate issue of backgrounds, bunker, validation

# NMX

- The half-selene idea looks really nice.
- Quite excited to see what comes from this.

# BEER

- Need to look at the m value in the middle of the guide, there are nice m-value studies for the focussing section that need to be extended to the central regions. Not so huge cost reductions to be expected.

# MAGIC

- Already have a science requirement on the straight optics
- Evaluate replacement of elliptic shapes with ballistic shapes
- We will have to think about this one. It looks already very well optimised(!), but we would like to challenge ourselves to find another concept if we can.

# ODIN

- Need to look at the bender option again.
- Need to study a more standardised ballistic shape with lower $m$ values in the centre

# DREAM

- Already well optimised, but not interested in benders without detailed shielding knowledge.
- No resources (links to NOSG support bottleneck and other ESS actions).
- Preferred option to lose line of sight would be a stack to deflect in the vertical direction, with an inclined beam extraction deflected horizontally afterwards, but at a large cost in performance at short wavelengths.

# VESPA

- Need to look at reducing the m value in the centre of the guide.
- (Possible performance gains in looking at beam extraction in more detail)
- Look at optimisation for shortest wavelength rather than white beam
- Need to progress fairly urgently with the guide design
- Proceed with examining possible collaboration with DREAM project on merging the optics design to a common solution

# CSPEC

- Design follows NOSG methodology very well.
- Sapphire filters are interesting for them as an option for background suppression.
- We need to study a ballistic tapering geometry at the start of the guide

# TREX

- Horizontal plane looks fairly good.
- Need to study replacing the vertical geometry with a ballistic guide maximum dimension of 8 cm as defined by the chopper window requirements.

# BIFROST

- Need to take the output of guide_bot and make more regular ballistic guide shapes where possible.
- Decide on need for short wavelengths

# MIRACLES

- The work was very well done with the guidelines at the time of the conceptual development.
- The optics needs to be adapted to the current moderator geometry
- Need to examine the CSPEC guide concept, at least in the vertical plane, to see if it is competitive for their needs.

# LOKI

- Looking at vertical bend is likely to be useful, for short instruments in particular. Should continue with this.

# SKADI

- Urgently need to recost the shielding with the latest NOSG estimates for their imminent scope setting.