

## Neutron Optics and Shielding Group TG2 Summary BEER Instrument

### Review

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Date  
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2017 TG2 Round for ESS Instruments

Technical Reviewer:  
Phil Bentley

Input received from  
Douglas DiJulio  
Damian Martin Rodriguez

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#### Preamble

This document is the review summary of the instrument's optical and shielding system preliminary design. Systems outside of this scope have not been considered, except where they significantly impact on optics and shielding.

#### 1. Executive Summary

The reviewer considers that from the *perspective of optics and shielding systems* the concept of the design is sufficiently complete and mature. However, there are significant deficiencies in working practice and risk assessments.

#### 2. Proposal Grading












For each item, a grade is given for the preliminary system design (column "NOSG Status"),

"GREEN": All aspects of the criterion have been addressed satisfactorily to permit endorsement by the NOSG to the detailed design phase.

"ORANGE": Some aspects of the criterion have not been addressed satisfactorily. However, if minor changes are made to the documentation or system then NOSG endorsement may be possible.

"RED": Some aspects of the criterion have not been addressed satisfactorily, and there are reasons to doubt they can be achieved without significant work. Currently it is not recommended to proceed.

Grades are indicated as traffic lights:  = green,  = orange,  = red.

| Criterion   | NOSG Status   | Comments |
|---|---|----------|
| Has adequate planning been done to move the project into Phase 2?   |    |          |
| Is the proposed budget consistent with the proposed scope?  |    |          |
| Does the preliminary design satisfy the requirements?   |    |          |
| Is the presented baseline technically sound?  |    |          |
| Has anything been forgotten or neglected?   |    |          |
| In case where several In-kind partners are collaborating – are roles and responsibilities adequately defined and agreed?                                    |    |          |
| Have safety-related aspects in accordance with ESS-0043330 ref [6] been appropriately considered?   |   |          |
| To what extent have appropriate connections been made with the critical project interfaces, such as software, data storage hardware and sample environment? | NA  |          |
| Has the instrument context been appropriately considered in terms of physical interfaces, such as bunker, beam extraction, ICS etc?                         |  |          |
| To what extent have available engineering standards been implemented appropriately?   |  |          |
| Are the cost and duration estimates reasonable?   |  |          |
| To what extent has the team planned appropriately for the risks, both technical and otherwise?  |  |          |

### 3. Currently identified issues

1. There is an extensive report about the Neutron Optics and Shielding design with comparison between alternative systems. We find that the BEER team is the first to have taken the NOSG documentation seriously. For this reason, there are no major issues of a technical nature to discuss, and most of the progress is really excellent.
2. Fig. 12 in the NOSG report is very useful to potential savings in the coating if it is needed. We find that the phase space maps and the brilliance transfer curves are reasonable.
3. The team make a comparison between having in-monolith built bispectral extraction, and not having any bispectral extraction. This is fair to compare, but we would also suggest a comparison with DREAM's bispectral extraction, as it has certain practical advantages in serviceability and maintenance.

### 4. Detailed/other comments

NOSG was asked by the project leader to comment on the critique in the report provided by the instrument class coordinator.

NOSG would state the following in response to this report:

1. We are satisfied that the optimisation of the optics, shielding, and associated budgets is done correctly.
2. The interfaces between optics and choppers has been done according to the appropriate standards as agreed between NOSG and NCG.
3. We agree with the instrument class coordinator that the design choices made by the instrument teams should be justified in the TG2 documentation, and this is the purpose of the document ESS-0059811. We think that the BEER team have done this extremely well.

### Additional Notes During Meeting

Floor loading is currently at 30 T / m<sup>2</sup>.

The shielding assumes 8 MeV gamma from Mn samples.