

Theme: «Scientific and methodological research and developments for condensed matter investigations with IBR-2 neutron beams» for 2021-2025

Project «Construction of a wide-aperture backscattering detector (BSD) for the HRFD diffractometer (proposed for implementation at JINR in 2021-2023)»

Review

of the (finishing) project activity report “Development of a wide-aperture backscattering detector (BSD) for the HRFD diffractometer”

The report on this project activity has preceded as planned. The development of the detector design has proceeded to the point where it can be executed as a whole. As such the project can be concluded to be a success: it is ready to be constructed as a whole. The results and outcome are of excellent quality.

The design and construction of a detector is a complex activity which stretches over many years. This activity comprised many key steps which are essential to be able to proceed with the detector.

In particular to be noted are:

- the configuring of suitable workshop area for the various stages of the construction - i.e. the various optical, mechanical and assembly work. This is a time-consuming preparation work - and the facilities resulting are excellent and appropriate for the detector construction (and future other detector construction)
- the detailed design of the BSD detector. It is adapted to the requirements of the instrument.
- training and prototyping work of the construction team. This is done. The team is highly skilled and capable of doing the delicate artisan work necessary for the detector construction.
- preparation of dedicated tools and jiggings for the detector assembly. For such artisan work as the construction of this detector, this is a huge effort. This has been done with great skill - and the tooling and jogs are exactly what is needed to ease and simplify the construction and also assure quality in the construction.
- preparation of the data acquisition.
- selection of appropriate materials for the detector.
- trials of manufacturing and partial manufacturing of the prototype. This is proceeding as planned and has been expertly carried out.

In summary, this project has proceeded as planned and sets up the stage well for the next stage: the main construction work of the BSD detector. The results thus far are excellent and adapted to the instrument needs.

Review of the (upcoming) project “Construction of a wide-aperture backscattering detector (BSD) for the HRFD diffractometer”

The proposed project is a continuation project from “Development of a wide-aperture backscattering detector (BSD) for the HRFD diffractometer”. The development project has proceeded smoothly - and is in a state that the main construction of the detector can be envisaged - see review of the project 2017-2020 for further details on that. The development is in an excellent state to be constructed for the instrument, i.e. it is safe to proceed with committal of funds.

In terms of the proposed activity on the construction for the coming years, the report presents the core details of the project plan - i.e. the goals, detector performance and specification, budget, schedule, partners/suppliers. The objectives and deliverables are clearly stated. The activity is broken down into appropriate brand tasks and milestones are identifiable. The largest oversight is that there is no explicit consideration of project risks; this should be done during the project execution. The project plan is competent and feasible and appropriate for the construction phase.

– scientific merits and intellectual contribution;

The conclusions of the previous review still apply. This project has merit and will deliver a much needed upgrade. The results of the project itself are publishable.

– technical feasibility of the project within the proposed timescale;

The conclusions of the previous review still apply. The development phase has prepared the necessary groundwork. The design is ready. The project can deliver in the time allowed. Care should be taken to monitor and assess progress against the project schedule.

The original technical design anyway builds upon existing technology at IBR2. Care should be take on quality control and quality assurance during the detector construction.

– compliance of the requested financial resources with the project objectives;

The material costs are approximately what the reviewer would assume for a costing and appear to be the right level. All costs are well justified. All usual expenses have been considered in the budget tables. The budget requests does therefore seem to be appropriate to proceed.

Labour costs are difficult to assess accurately, due to incomplete knowledge by the reviewer of the relevant labour costs.

– availability of adequate human resources at JINR and in the collaborating institutions.

Considerable effort has been made into providing training during the development phase. The construction team is highly skilled and dedicated to the task. Having met the team, they are well formed and working together. The people are available for this construction task.

Care should always be taken to avoid and mitigate for loss of key persons and to improve staff retention. This is something which should be watched throughout the project.

Overall Summary:

The reviewer recommend that this project be approved and proceeds. It is a necessary upgrade. The preparation work has been well executed over the past few years. The project plan is appropriate for the detector construction and the coming years. The detector technology and design is ready. Risks to this plan should be considered and mitigated during its execution.

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