

Review of the application for opening a new JINR topical theme “Development of the SOLCRYS structural research laboratory at the SOLARIS National Synchrotron Centre”

To whom it may concern:

The two most widely utilized experimental techniques for the structural studies of condensed matter are based on neutron and X-ray scattering. Separately or together, they reveal the structural characteristics on the scale of atomistic, molecular, and supramolecular distances in both hard and soft condensed matter, whether organized in crystal or non-crystal arrangements. A few results published in high impact journals, and results awarded by highly recognizable prizes could have been done without a direct or indirect use of these approaches.

The ever-increasing success of scattering techniques stimulated unforeseen development of their sources, that in turn enabled new areas of applicability. The scale of sizes and powers of these sources ranges nowadays from desktop instruments into large facilities, depending on the application. Among X-ray sources, a medium size synchrotron became highly popular, yet affordable solution. Its advantage is an effective facility exploration while allowing a flexibility to implement various instruments.

The instruments proposed to be constructed by JINR at the SOLARIS National Synchrotron Centre in Cracow, Poland are focused clearly on the studies in the fields of hard and soft condensed matter with an option to be studied at extreme conditions. The fields are aligned well with the existing scientific directions of JINR and recognized by wider scientific community. It is therefore fair to assume a seamless accommodation of possibilities brought by the proposed instruments within the research performed by JINR scientists, and even new competencies to be born. In either case, the high impact research results are to be expected.

The technical parameters of new instruments outlined in the proposal suggest their high performance once constructed. On the other hand, all of the components proposed to be acquired are the once with proven concepts and well-established reliability. This strategy helps to mitigate the risks linked with the experimental instrumentations. It also allows to make more realistic estimates on the project's budget and time schedule as outlined by the authors.

In overall, I support the development of the SOLCRYS structural research laboratory based on the X-ray scattering techniques as outlined in the reviewed proposal. I recommend opening the new theme within the topical plan for JINR research and support it by the appropriate financing.



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