National Institute of Chemical Physics and Biophysics (NICPB)

1. Scientific Impact of Research

1.1. Positive aspects
The structural units (according to self-evaluation report) of NICPB are four laboratories (High Energy Physics and Computational Physics Laboratory, Laboratory of Chemical Physics, Laboratory of Environmental Toxicology and Laboratory of Bioenergetics), administration, science council of the institute and the international science advisory board. Research in natural sciences at the NICPB is generally strong at the national level and, in most subject areas, internationally as well. Examples of international research projects include an European Research Council project titled 'How do chiral superconductors break time reversal symmetry? – Kerr spectroscopy study' and an H2020 project titled 'Nanocomposite Engineered Particles for Phosphorus Recovery and Toxicological Risk Assessment for the Aquatic Environment'. The majority of papers are published in good or very good journals and there are examples of excellent and potentially ground - breaking results. International students are involved in the different research groups. Some researchers have achieved international visibility through their publications in very good journals, international conference attendance and presentations, including a good proportion of invited talks and some keynote presentations. Most of the conferences attended are at the international level.
1.2. Areas for improvement
It seems that the topics covered by the NICPB are quite broad, and it is not clear whether a critical mass is reached in all areas. The research topic “environmental toxicology, including studies on micro plastics and the effects of chemicals on ecosystems”, appears to be a somewhat smaller focus area at the NICPB compared to other research fields.

1.3. Recommendations
While the NICPB should keep the good balance between fundamental and applied research, the research topic “environmental toxicology, including studies on micro plastics and the effects of chemicals on ecosystems” would benefit from further strengthening in terms of funding and staff.
Assessment of the scientific impact of research:
Exceeds threshold.

2. Sustainability of Research

2.1. Positive aspects
The NICPB carries out important research and is a significant partner in several collaborative R&D projects. In fact, the researchers at NICPB have established internaat CERN and ESA, and in Estonian Centre of Excellence, which it is leading. The main building of NICPB as renovated in 2019 to improve energy efficiency and working conditions, as the result NICPB now has a ventilation system while overall heating and electricity consumption decreased. In 2023 the NICPB installed solar cells on the roof of the main building and purchased a battery storage container that should further reduce electricity costs. The Physics laboratories are well equipped with main equipment, such as 6 NMR spectrometers, spectrophotometer, multichannel confocal fluorescence microscope and other. The Laboratory of Environmental Toxicology has expertise and facilities for nanomaterials' synthesis and physicochemical characterization. It possesses instruments like TEM, SEM, XRD, XPS and FTIR and provides services for TalTech and Riga Technical University. The Laboratory of Bioenergetics has equipment for work with cultured cells. The cell culture lab provides the capability to conduct experiments under verified conditions, and this, in turn, allowed to extend the research topics from cardiac cell to cancer cell research. The infrastructure of the institute profited from European regional funds.

2.2. Areas for improvement

The biggest challenge in the field of sustainability on the institute level is finding a balance between developing new competences and maintaining existing ones while having 84% grant-based funding. This means that the vast majority of researchers get their salaries from grants, which is an inherently unstable career situation. In addition, the fraction of EU funding is rather low and the fact that EU regional funds will end provides further challenges. During the visit, the impression was gained that the necessary organizational changes regarding the role of the NICPB within the research landscape in Estonia are being impeded by the obstinacy of the NICPB's leadership.

2.3. Recommendations

It seems necessary to find a solution regarding the role of the NIPCB within the research landscape in Estonia, to secure its long-term future and prosperity. In addition, the fraction of base funding should be raised considerably, so that sustainable long-term research prospective can be established at the NICPB.

Assessment of the sustainability of research

Exceeds threshold.

3. Societal Impact of Research

3.1. Positive aspects

The NICPB carries out important research and is an important partner in R&D inside and outside the academic community. Their research in high-energy physics was one reason that 2024 Estonia has been approved to become a Full Member of CERN. Natural scientists at

NICPB participate in collaborative projects aimed at improving the society and the living environment. They also participate in government and industry consultations related to R&D activities and serve on advisory committees, management boards and as consultants on important societal issues. The NICPB provides ecotoxicology services for Estonia. Various scientific conferences and events have been organized, most of them were held in Estonia.

Some members of the NICPB are very active in participation in national and international working groups and networks. From time to time, NICPB scientists participate in public discussions on a variety of topics of interest to the general public. Schoolchildren visit the institute several times a year and, after a general introduction, can choose which laboratories they would like to visit during a longer tour. The NICPB takes part in the “Night of Science” events and offers laboratory tours. In addition, the researchers of NICPB participate in the popularization of their research on TV shows and publish science popularization articles.

3.2. Areas for improvement

Information about upcoming events for the public and for schoolchildren seems absent on the website.

3.3. Recommendations

A clearly structured program of public engagement activities, announced on the website, would certainly help to reach the public. Adding easy-to-follow tutorials on important aspects of scientific issues and results could also be very helpful.

Assessment of the societal impact of research

Exceeds threshold.

4. Assessment proposal

4.1. Proposal summary
In accordance with Section 8.4 of the Regular Evaluation Guidance 2024, the research and development activities of the National Institute of Chemical Physics and Biophysics in the field of Natural Sciences are proposed to be evaluated **positively**, as all assessment criteria meet or exceed the established thresholds.

5. Additional Feedback

5.1. Feedback on the institution's additional questions that are described at the final page of the report
N/A