**SLCJDescription of the infrastructure**

Name of the infrastructure (and its installations, if applicable):

NLC-SLCJ

NLC-CCB

Location (town, country) of the infrastructure: *If the infrastructure comprises more than one installation (i.e. parts of the infrastructure that can be used independently and for which the operating costs can be singled out) at different locations, indicate briefly the location of each installation and give a justification for considering them as a single infrastructure.*

NLC is a consortium of the two institutions –

Heavy Ion Laboratory of the University of Warsaw, Warsaw, Poland (SLCJ)

and
Centrum Cyklotronowe Bronowice, Kraków, Poland (CCB)

Web site address:

[www.slcj.uw.edu.pl](http://www.slcj.uw.edu.pl)

www.ifj.edu.pl

Annual operating costs (excl. investment costs) of the infrastructure (€):

SLCJ: 6 984 103.20zł = 1 693 444.35 € (for 2020, ECB avarage exchange rate 4.1242)

CCB (incl. medical part): 2.5 M€

Description of the infrastructure: *Give a brief general description of the infrastructure to which access is offered. Illustrate, in particular, its state-of-the-art equipment and services offered to users that make it rare or unique in Europe. Outline the areas of research normally supported by the infrastructure, as well as new areas opening to users, if any. If the infrastructure is composed of several installations, describe these including their specific features. If parts of the infrastructure are still under construction, specify the starting date of construction and indicate the date when access can realistically be made available.*

SLCJ Warsaw:

- Isochronous heavy-ion cyclotron (K=160)**,** equipped with with the two ECR sources, accelerating beams from He up to Ar (soon up to Xe) up to energy of 10 MeV/A

* 4π gamma-ray array **EAGLE** (20 HPG detectors with anti-Compton shielding) and associated ancillary detectors (scattering chamber with pin-diode detectors, 4π charged particle multiplicity filter, internal conversion electron spectrometer, possible integration with the **PARIS** gamma-ray calorimeter and the **NEDA** neutron detector),
* large, universal scattering chamber **ICARE** (from IReS Strasbourg),
* scattering chamber **CUDAC** for a charge particles spectroscopy,
* gamma-ray spectrometer **JANOSIK** for GDR studies,
* irradiation station for radiobiology (with a cells’ laboratory infrastructure) and material interdisciplinary studies,
* irradiation chambers with target water cooling;,
* low background lead shielded HPGe counters.

CCB Krakow:

- Proton cyclotron PROTEUS (IBA)

**-** Big Instrument for Nuclear Data Analysis (**BINA**), detection setup, which includes a liquid-target assembly, multiwire chamber and scintillation hodoscope. BINA will be used for in-beam experimental investigations of the dynamics of few-nucleon systems: systematic studies of three-nucleon force (3NF), Coulomb and relativistic effects, as well as their mutual interplay in the proton-deuteron system.

**-** high-energy gamma-ray detection system consisting of an array of eight large volume BaF2 detectors (HECTOR array), which can be complemented with few clusters of the PARIS array. It will be used for studies of the structure of high-lying resonance states by inelastic scattering or fusion-evaporation reactions induced by protons.

**-** high-energy gamma-ray detection system PARIS (LaBr3/CeBr3+NaI phoswiches)

- KRATTA (Kraków Triple Telescope Array): 35 multi-module telescopes for charged-particle detection;

- setup for investigation of gamma emission in experimental modelling of hadron therapy

* large reaction chamber
* large volume LaBr3 detectors
* DSSS detectors

Services currently offered by the infrastructure: *Describe the services offered by the infrastructure and its research environment, and demonstrate how they will enable scientists to carry out high-quality research, giving examples of relevant scientific achievements it enabled. Demonstrate that there is a widespread interest from users in other countries to conduct research at the infrastructure (or make otherwise use of its services), e.g. by indicating the number of international users currently using the facility per year.*

SLCJ has at its disposal: mechanical and electronics workshops, target laboratory, detector laboratory, library, two conference rooms, hostel for experimental teams (9 rooms), 15 scientists and 38 technicians ready to help an external user.

CCB Krakow offers library and a conference room. CCB has at its disposal mechanical and electronics workshops. In addition 7 scientists and 6 technicians can help the external users.

**Description of work**

Modality of access under this proposal: *Outline how a user, or user group, will be given access to the infrastructure or to its services (e.g.* ***trans-national/virtual****, type of equipment/service used, expected output/deliverables, etc.).*

*For* ***trans-national access*** *indicate the typical execution and duration of work (if access is provided ‘in person’, thus not remotely, indicated the estimated number of days spent at the infrastructure), and, where relevant, how the users will be integrated into the scheduling of the infrastructure and the degree of independence they will experience with respect to the normal research activity of the infrastructure.* *Define clearly, for each installation, the* ***unit of access*** *used to measure the access offered and indicate what is covered and included (e.g. preparatory work, specific training courses) in one unit. This is essential for monitoring the access provided under this project, but also to justify the corresponding costs. Indicate for each installation which modality will be used to declare access costs (on the basis of* ***unit cost****, as* ***actual cost****, or as a* ***combination*** *of the two) and justify your choice.*

*For* ***virtual access****, define clearly, for each installation, the* ***unit of access*** *used to measure the access offered and indicate what is covered and included in one unit. This is essential for monitoring the access provided under the project, but also to justify the corresponding costs. Indicate for each installation which modality will be used to declare access costs (on the basis of* ***unit cost****, as* ***actual cost****, or as a* ***combination*** *of the two) and justify your choice.*

SLCJ Warsaw provides for TNA access about 1200 hours of beam time per 4 years, which corresponds to about 10 experiments in the areas of nuclear physics, biology, nano-dosimetry and medical applications, including isotope production. The access costs will be calculated on the basis of unit cost.

Since CCB Krakow is also a medical facility, where proton therapy of tumours with the two gantries has a priority, the nuclear physics experiments will have to be conducted during the time free of patients’ treatment. This will be mainly at nights and during the weekends. Altogether 600 hours of beam time will be provided at CCB per 4 years within TNA, which corresponds to 6 experiments. The access costs will be calculated on the basis of unit cost.

Support offered under this proposal: *Describe the scientific, technical and, for trans-national access, logistic support that would be offered to the users. Where relevant, emphasise the quality of the scientific environment in which the users will be working and explain how this might stimulate their research. Explain to what extent such support is already routinely provided to external users.*

Technical assistance of all kinds is provided by the SLCJ and CCB technical staff. Mechanical and electronic workshops are available for the users. Both might help in manufacturing and setting up equipment for use in experiments. A target laboratory can produce targets and a detector laboratory will help with handling/repairing detectors. The beam is tuned to the user's target, after discussion with beam engineers to define the experimentalist's goals. In house physicists assist and support the experimental teams in setup of experimental facilities and to perform measurements.

Outreach to new users: *State what measures are taken to attract new potential users (e.g. web page, call for proposals, etc.), including specific user groups such as users coming from SMEs or representing new areas of research, if appropriate. Indicate why and to which extent the EU funding of this trans-national and/or virtual access activity will provide European research teams with new opportunities of access to the infrastructure. Indicate whether the number of trans-national and/or virtual users is expected to increase as a result of this proposal, and how you will monitor such an increase. If trans-national access to the infrastructure is being opened to users other than those from the host country of the infrastructure for the first time, what evidence is there that there will be sufficient demand for the access offered under this proposal?*

Information about NLC facilities (technical and scientific information, calls for proposals, European support) is available online: [www.ifj.edu.pl](http://www.ifj.edu.pl) and http://slcj.uw.edu.pl/

All workshops and conferences organized by IFJ PAN and SLCJ Warsaw are also widely advertised by email distribution, and information posted on the website.

Review procedure under this proposal: *For trans-national access activities, describe the peer review procedure that will be used to select users under this proposal. Outline the composition of the User Selection Panel. Demonstrate that the selection of users will follow the principles of transparency, fairness and impartiality. As the selection will be based on the evaluation of scientific merit of the applications, but with priority to new users and users coming from countries where such infrastructure is not available, indicate any additional selection rule that you would like to add.*

*For virtual access activities, describe how and when the periodical assessment of the services offered to the scientific community will be carried out (e.g. by an international review panel). The corresponding assessment reports must be defined as deliverables to the EC.*

At SLCJ, the research proposals for performing measurements are evaluated by the Programme Advisory Committee (PAC). The new members will be nominated by SLCJ Council in September, 2021.

At CCB there is an International Advisory Committee (IAC) to coordinate all activities related to the basic research programme. The Committee members are internationally recognised physicists: 12 from EU (including 5 from Poland), 1 from USA, and 1 from Japan.