I. Local Research Infrastructure (Megascience)

Scientific domain	Country	Name, contact information	Description
Energy	Brasil	Brazilian Centre for Research in Energy and Materials, CNPEM	The CNPEM is a private research and development institution (R&D) mainly owned by the Brazilian Ministry of Science, Technology, and Innovation (MCTI). CNP responsible for the management of the following main research laboratories: Br Synchrotron Light Laboratory (LNLS), Bioscience Lab (LNBio), National S&T Laboratory for Bioethanol (CTBE), and the National Laboratory for Nanotechnology (LNNano). The four CNPEM's national laboratories have facilities open to academic and business communities of Brazil and overseas. On average, 1900 external researchers are benefited annually by the campus infrastructure. The laboratories also develop their own research projects and participate in the cross-investigation agenda coordinated by the CNPEM, combining facilities and scientific skills around strategic themes related to energy and materials
		Brazilian Bioethanol Sci&Tech Laboratory, CTBE	The CTBE investigates new technologies in bioenergy The CTBE is a National Laboratory that operates with the scientific and technological community and the Brazilian productive sector, aiming to contribute to the maintenance of competence of the Country in the production of sugarcane ethanol and other compounds from biomass. The CTBE Mission is contributing to the advancement of scientific technological knowledge in the production, use and conversion of biomasses on energy materials, through research, development, innovation and personnel training
	China	Experimental Advanced Superconducting Tokamak, EAST http://www.ipp.cas.cn/ http://east.ipp.ac.cn/	EAST tokamak is designed on the basis of the latest tokamak achievements of the last century, aiming at the world fusion research forefront. Its mission is to conduct fundamental physics and engineering researches on advanced tokamak fusion reactors with a steady, safe and high performance, to provide a scientific base for experimental reactor design and construction, and to promote the development of plasma physics and related disciplines and technologies. EAST has three distinct features: non-circular cross-section, fully superconducting magnets and fully actively water cooled plasma facing components which will be beneficial to explore the advanced steady-state plasma operation modes. _____ EAST is fully open to the world fusion community as a valuable test bench for physical and technical issues on advanced steady-state plasma operation for ITER and future DEMO. It warmly welcomes all fusion/plasma scientists and engineers in the world come to EAST to explore the relevant theory, physics, and technology for fusion energy. It includes, but not limited in, plasma control, wave heating and current drive, divertor, plasma surface interaction, superconducting technology, high efficient cooling, remote handling maintenance, etc.. The partners can join the research on EAST by bring innovative ideas, know-how, or additional funds with bilateral agreements. The scientists and engineers can also work on EAST as a staff, guest professor, post-doctor, Master/Ph. D student.
	Russia	Tokamak IGNITOR Mikhail Popov, Deputy Director NRC «Kurchatov Institute», Popov_MV@nrcki.ru	IGNITOR is the first in the world tokamak with high magnetic field. The ignition of thermonuclear reaction in IGNITOR will be set up at the flowing current without extra heating devices. The design (dimensions) of IGNITOR will be much less than international thermonuclear reactor ITER. For current excitation will be used central solenoid with high field (more than 14 T). Plasma will be stabilized at strong poloidal magnetic fields. _____ Originally bilateral Russian-Italian collaboration in the framework of the Tokamak «IGNITOR» project realization will be open for the International Tokamak Research Centers on the construction phase.
Nanotechnology	Brasil	Brazilian Nanotechnology National Laboratory, LNNANO	LNNano conducts investigations with advanced materials, besides hosting the China-Brazil Binational Center for Nanotechnology. The Brazilian Nanotechnology National Laboratory (LNNano) was created in 2011. LNNano aims to attend the scientific and industrial community and to align with thematic RD&I programs of CNPEM.

			The laboratory seeks, by means of applied and basic research carried out by its researchers, experts and technicians, to exploit the opportunities offered by nanotechnology to satisfy the needs of agriculture, industry and services on the regional, national and international scale, aiming at the creation and development of sustainable products and processes and the generation of knowledge and wealth. _____ The LNNano collaborates with its partner laboratories in CNPEM for the characterization of advanced materials and the creation and implementation of novel search methodologies. Unique in the world since it is the first laboratory which has perform implementation of thermomechanical simulation and X-ray scattering (XTMS) equipment associated with an X-ray diffraction line of the LNLS (XRD1). This attracts outstanding researchers from Brazil and other countries such as the USA, Argentina, India and Japan. In 2013, the LNNano — in collaboration with the LNLS - has completed the installation of an apertureless scanning nearfield optical microscope (SNOM) at the LNLS IR beamline (IR1)
Bioscience	Brasil	Brazilian Bioscience National Laboratory, LNBIO	LNBio conducts research in frontier areas of Bioscience, focusing on biotechnology and drugs LNBio is responsible for the following programs: a. The Cancer Biology Scientific Program, This program aims at the prospection of potential candidate biomarkers, target molecules, active compounds and delivery strategies for therapeutic purposes, and likely for diagnosis, prognosis and treatment follow-up stages. b. Neglected diseases c. Biology of the Cardiovascular System d. Microorganisms and plants At LNBio several research projects aiming at studying the molecular mechanisms governing plant-pathogen interactions. LNBio has employed a multidisciplinary approach to investigate the biological role of plant proteins involved in resistance against bacterial pathogens as well as the function of bacterial and fungal proteins required for pathogenicity or pathogen adaptation in the host
Astronomy	South Africa	Southern African Large Telescope, SALT www.salt.ac.za Dr Ted Williams, williams@saao.ac.za , Director PO Box 9, Observatory, 7935, South Africa Tel: +27 (0)23 571 1205 | Fax: +27 (0)23 571 2456	To provide a large telescope (10m diameter) for optical and near infra-red astronomy. It is used to tackle fundamental questions about how the Universe works. SALT collects light from astronomical objects and accurately focuses it on one of four selectable foci. The light then proceeds into an optical instrument while the telescope tracks the relative movement of the object across the sky to maximise exposure time. _____ SALT is seeking partners who wish to purchase observing time without becoming a shareholder, alternatively, additional partners who wish to contribute to the project will be welcomed as well.
		Square kilometre array, SKA www.skatelescope.org Professor Philip Diamond Director General E-mail: p.diamond@skatelescope.org Jodrell Bank	The SKA project is an international effort to build the world's largest radio telescope, with a square kilometre (one million square metres) of collecting area. The scale of the SKA represents a huge leap forward in both the engineering and research & development of radio telescopes, and will deliver a transformational increase in science capability when operational. Deploying thousands of radio telescopes, in three unique configurations, it will enable astronomers to monitor the sky in unprecedented detail and survey the entire sky thousands of times faster than any system currently in existence. The SKA telescope will be co-located in Africa and in Australia. It will have an unprecedented scope in observations, exceeding the image resolution quality of the Hubble Space Telescope by a factor of 50 times, whilst also having the ability to image huge areas of sky simultaneously. With a range of other large telescopes in the optical and infrared being built and launched into space over the coming decades, the SKA will perfectly augment, complement and lead the way in scientific discovery. The SKA Organisation, with its headquarters at Jodrell Bank Observatory, near

		The University of Manchester The University of Manchester Macclesfield, Cheshire, SK11 9DL United Kingdom Phone: +44 (0)1477 571321 Fax +44 (0) 1477 571618	Manchester, UK, was established in December 2011 as a not-for-profit company in order to formalise relationships between the international partners and to centralise the leadership of the project. Eleven countries are currently members of the SKA Organisation _____ It is possible for new members to join the project during the current pre-construction (detailed design) phase of the project, which it is foreseen will run until 2018. Either full or associate membership is possible, full membership requiring a cash membership contribution, and associate membership not. Both full and associate members contribute in-kind to the work of design consortia working through a globally distributed programme (already underway) in the following areas: Assembly, Integration and Verification; Central Signal Processor; Dish; Infrastructure; Low-Frequency Aperture Array; Mid-Frequency Aperture Array; Signal and Data Transport; Science Data Processor; Telescope Manager; Wideband Single Pixel Feeds. Associate Members can participate in project meetings without voting rights and are required to upgrade to full membership during the pre-construction phase. In 2015 formal negotiations are due to start to prepare for the establishment of the legal entity to govern the construction and operation phases of the project. The new governance structure will have the flexibility to allow new members to join the project at any time.
Fundamental physics	Brasil	SIRIUS – The Brazilian Synchrotron Light Laboratory, LNLS	3 GeV, 4th generation synchrotron light source, emittance of 0.27 nm.rad, 13 beamlines in the first phase, will be able to hold up to 40 beamlines, first beam schedule for 2018. It is an evolution of the current 2nd generation light source already in operation at LNLS. The current source is a 1.37 GeV machine, 100 nm.rad, with 18 operational beamlines. It is today the only synchrotron light source in Latin-America.
	China	Beijing Electron Positron Collider, **BEPC & BEPCII** http://english.ihep.cas.cn/	BEPC II is a two-ring e+e- collider running in the tau-charm energy region (Ecm = 2.0-4.2 GeV), which, with a design luminosity of 1 × 1033 cm-2s-1 at the beam energy of 1.89 GeV, is an improvement of a factor of 100 over its successful predecessor, BEPC. The machine also provides a high flux of synchrotron radiation at beam energy of 2.5 GeV. _____ 1. Welcome to join BESIII collaboration to analyse BESIII data for τ-charm physics study. The related procedure and the management policy can be found at website http://bes3.ihep.ac.cn/orga/manage.htm. 2. BEPCII is also for producing synchrotron radiation —Beijing Synchrotron Radiation Facility (BSRF). BSRF welcome international users to come to do multidisciplinary research. The procedure for users to apply for beam time at BSRF is in accordance with international practices.
		Heavy Ion Research Facility at Lanzhou, HIRFL www.impcas.ac.cn/	Employing low and high energy heavy ion beams provided by accelerators, to search for the existing limit of super heavy elements, to study the nuclear structure and properties, nuclear processes relevant to astrophysics, atomic structure in strong fields and atomic collision dynamics, radiation damage of materials, radiobiological Effects. New technology in accelerator development and ion sources. _____ International partners will participate actively in the construction of the RI and associated detector systems. They would bring their expertise, know-how and additional funds to the HIRFL. It is proposed that international partners take part in the construction of the new facility – HIAF. The conditions to use the new facility in future could be signed through bilateral negotiations.
		Qiangguang 10 PW, SIOM (Shanghai Institute for Optics and Fine Mechanics)	
	India	India-based Neutrino Observatory, INO	The project aims to create an underground laboratory in India where front ranking experiments in the area of neutrino physics can be carried out. This site can also be used to setup experiments to study dark matter. Development of particle detectors of various kinds will be an integral part of this project. The project will have two components:

		www.ino.tifr.res.in	• Development of underground laboratory infrastructure and support services • the Iron Calorimeter (ICAL). _____ A 50 kiloton Magnetised Iron Calorimeter detector (ICAL) to be set up in the INO facility will address the neutrino mass hierarchy issue using atmospheric neutrinos. International partners are welcome to participate in the construction of the ICAL detector and its operation as well as in the analysis of the data as equal partners. The exact role of partners and their contributions could be defined through bilateral agreements between the partners and INO. International partners are also welcome to join other proposed experiments like dark matter search and neutrino-less double beta decay to be setup in the INO underground facility.
		Ultrashort Pulse High Intensity Laser Laboratory Tata Institute of Fundamental Research (TIFR)	
	Russia	A Superconducting accelerator complex NICA (Nuclotron-based Ion Collider fAscility) Vladimir Kekelidze, Professor, Joint Institute for Nuclear Research Vladimir.Kekelidze@cern.ch http://nica.jinr.ru/	NICA is the new accelerator complex. The aim of realization complex NICA is to start in the coming years experimental study of hot and dense strongly interacting QCD matter and search for possible manifestation of signs of the mixed phase and critical endpoint in heavy ion like Au, Pb or U collisions. Range of center-of-mass energy available for experiments is 4–9 GeV·u^{-1} with average luminosity of 10^{27} $cm^{-2}·s^{-1}$. _____ The NICA collaboration includes already more than 110 scientific centers and organizations from more than 30 countries. About 190 scientists participate in the NICA physical programme preparation (see http://theor.jinr.ru/twiki/pub/NICA/WebHome/WhitePaper_10.01.pdf). More than 300 experts participate in accelerator complex design and construction and more than 300 physicists are involved in design and preparation of the MPD, BM@N and SPD detectors. It is expected that the collaboration will be extended by physicists and engineers both from Russia and other countries.
		Reactor complex PIK Mikhail Popov, Deputy Director NRC «Kurchatov Institute», Popov_MV@nrcki.ru http://www.pnpi.spb.ru/	One of the highest research nuclear reactor in Europe. The main feature of complex PIK consists in multifunctionality and interdisciplinarity. On the base of the reactor complex PIK will be built up The International Center for Neutron Research. Creation of this center will enable to conduct breakthrough investigations in the field of condensed matter physics, biology, physics of polymers, neutron and nuclear physics and physics of elementary particles and fundamental interactions, which will contribute to supporting Russian Federation leadership in scientific community. Technical characteristics: max. heating power – 100 MWatt; The flux density of thermal neutrons – $5·10^{15}$ $cm^{-2}·c^{-1}$; max. volumetric energy-release in active zone – 6,6 MWatt·l^{-1}. _____ Currently there are already exist or in preparation cooperation agreements on the joint use of the experimental reactor PIK stations with the Helmholtz Zentrum Geesthacht (GKSS) (Germany, Hamburg), a research centre of the Helmholtz Society in Jülich (HFZ Julich) (Jülich, Germany), the Budapest Neutron Centre (Budapest, Hungary) and the European Centre for Neutron Research – Institute. Laue-Langevin (Grenoble, France). There are perspectives for collaboration with European Spallation Source – ESS (Lund, Sweden). The ICNR on the basis of PIK Reactor Complex is open for collaboration with International Research Centers which activities are based on neutron research.
		Super synchrotron radiation source of the 4th generation (SSRS-4)	The synchrotron radiation source of the 4th generation will have high space coherence corresponding to laser radiation, high brightness and temporal pattern. The main scientific directions are used SRS-4 will be consisted in researching of structure and dynamics of substance with atomic space and femtosecond temporal resolution, developing new synthesis and characterization of nanostructure materials, researching in sphere of biomedicine, etc. Technical characteristics: photon energy – 1-30 keV, average luminiosity – about 10^{24} photons·sec·mm^{-2}·$mgrad^{-2}$, duration of an electronic bunch – 0,1 ps.

		Mikhail Popov, Deputy Director NRC «Kurchatov Institute», Popov_MV@nrcki.ru	_____ The representatives of NRC "Kurchatov Institute", ANL, DESY, ESRF, SLAC and SPRING-8 recognize the importance of X-ray science for the future development of International Society beyond 2020 and signed Agreement on International Design Effort for the Future Light Source (Moscow Communiqué). The purpose of the Agreement is to collaborate on design of unique new generation facility on the basis of Synchrotron Radiation Source of the 4th generation. The SSRS-4 project is open for collaboration with International Research Centers which activities are based on using the synchrotron radiation sources.
		Exawatt Center for Extreme Light Studies (XCELS) Litvak Alexander, Director, Institute of Applied Physics RAS litvak@appl.sci-nnov.ru http://www.xcels.iapras.ru/	A large research infrastructure – the Exawatt Center for Extreme Light Studies, will be a new unique source of light having the power of about 200 Petawatt with a further prospect to increase it up to 1 Exawatt (1 Exawatt = 10^{18} W) and beyond. The research program includes such scientific direction as high energy physics, nuclear physics, astrophysics, and biomedicine. _____ XCELS would like to explore possible collaboration opportunities with: • ELI delivery consortium international association (EC) • Commissariat of Atomic Energy of France • Thales (France) • Deutsches Elektronen-Synchrotron DESY (Germany) • Center for Antiproton and Ion Research FAIR (Germany) • Rutherford Appleton Laboratory (UK) • John Adams Institute for Accelerator Science (UK) • Institute of Laser Engineering Osaka University (Japan) • High Energy Accelerator Research Organization KEK (Japan) • Shanghai Institute of Optics and Fine Mechanics (China) Gwangju Institute of Science and Technology (Korea)
		A Super c-τ (charm-tau) Factory Iouri Tikhonov, professor, Budker Institute of Nuclear Physics RAS, Iouri.Tikhonov@cern.ch https://ctd.inp.nsk.su/c-tau/	An electron-positron collider operating in the range of energies from 2-6 GeV with a high luminosity of about 10^{35} $cm^{-2}·s·^{-1}$. Study of the processes with c quarks or τ leptons, the search and study of an entirely new form of matter: glueballs, hybrids, etc. The data, which are planned to record, by 3-4 orders exceed everything that has been recorded so far in any other experiment. _____ The scientists from Dubna and IHEP at BEPS II are interesting in participation in Super-Tau Charm Factory program. They also have an intention to develop Super-Tau Charm Factory project in China. There is the signed agreement between Budker INP and Dubna.