Technical Meeting on Management Strategies for Accelerator Facilities

Report of Contributions

https://conferences.iaea.org/e/mgt-strat-acc

Contribution ID: **0** Type: **not specified**

Welcome from the Soleil DG

Monday 15 September 2014 11:00 (10 minutes)

Presenter: DAILLANT, Jean (Synchrotron Soleil)

Session Classification: Opening Session

Contribution ID: **1** Type: **not specified**

Welcome from French Atomic Energy Commission

Monday 15 September 2014 11:10 (10 minutes)

Presenter: FIONI, Gabriele (Head of the Direction of Material Science at the French Atomic Energy Commission)

Session Classification: Opening Session

Contribution ID: **2** Type: **not specified**

Welcome from CNRS

Monday 15 September 2014 11:20 (10 minutes)

Presenter: TALEB-IBRAHIMI, Amina

Session Classification: Opening Session

Contribution ID: **3** Type: **not specified**

Welcome from IAEA

Monday 15 September 2014 11:30 (10 minutes)

Presenter: SIMON, Aliz (IAEA Physics Section)

Session Classification: Opening Session

Contribution ID: **4** Type: **not specified**

Overview on Synchrotron SOLEIL: Infrastructure and Collaborations

Monday 15 September 2014 13:45 (20 minutes)

Presenter: NADJI, Amor (Synchrotron Soleil)

Session Classification: Opening Session

Contribution ID: **5** Type: **Contributed**

New IAEA Initiatives to Advance Accelerator-based Research & Development

Monday 15 September 2014 14:05 (20 minutes)

The IAEA Physics Section is pursuing efforts on utilizing particle accelerators to support fundamental and applied research, characterize and qualify materials of nuclear interest and provide education and training.
The IAEA's coordinated research activities are designed to stimulate and coordinate research in IAEA Member States in selected nuclear fields. These coordinated research activities are normally implemented through Coordinated Research Projects that bring together research institutes from both developing and developed Member States to collaborate on the research topic of interest.
Furthermore, it is also recognized that establishment and operation of accelerator facilities require more attention because of their complexity and remarkable costs involved. Operation schemes of various types of accelerator facilities in response to the users'requirements, standardisation of the beamlines, performance indicators and figures of merit are only a few aspects which require coordinated and joint actions in order to improve the reliability of the service in a cost effective way. One of the new initiatives is that we support to develop and coordinate aspects of management strategies for accelerator facilities.
The IAEA Physics Section is launching a new Accelerator Knowledge Portal (AKP) for the benefit of accelerator scientists, accelerator users and service providers worldwide. The knowledge portal offers not only a database of MV particle accelerators in the world, but it has several networking and community features in an attempt to bring together the accelerator community, as well as provide information to accelerator users and policy makers, too. http://nucleus.iaea.org/sites/accelerators/.
The establishment of sustainable education and training programmes is fundamental for the safe, secure and efficient development of the nuclear field. The IAEA offers a wide spectrum of activities in support of education, training, human resource development and capacity building including interregional, regional and national training courses and workshops; assists visits and reviews services; initiates, formulates and runs programmes; networks managers and specialists for sharing good practices; assists in publications that compile the best international practices; supplies training materials and training tools; and supports internship programmes for the young generations of scientists and fellows.
For the developing countries, the Technical Cooperation Programme provides the necessary skills and equipment to establish sustainable technology in the counterpart country or region through training courses, expert missions, fellowships, scientific visits, and provision of equipment.
The different activities to achieve our objectives and new initiatives in the field of "Accelerators" which define our programme at the IAEA Physics Section will be presented.

Presenter: SIMON, Aliz (IAEA Physics Section)

Session Classification: Opening Session

Contribution ID: **6** Type: **not specified**

Introduction to the Technical Meeting (Amor Nadji and Aliz Simon, Co-Chairs)

Monday 15 September 2014 14:25 (20 minutes)

Presenters: SIMON, Aliz (IAEA Physics Section); NADJI, Amor (Synchrotron Soleil)

Session Classification: Opening Session

Contribution ID: **7** Type: **Invited**

Particle Accelerators: From Design to Operation

Monday 15 September 2014 15:15 (50 minutes)

Introduction of particle accelerators will be given including a historical overview and different types and domains of accelerators. LHC will be given as an example to illustrate the different phases: design, technology challenges, production of the components, infrastructures, installation, power and beam commissioning, operation (with indicators), maintenance, consolidation and upgrade.
The global roadmap of CERN and more generally of High Energy Physics in the next 50 years will be discussed.
Conclusion with the lessons learned during the long process from accelerator design to operation will end the talk.

Presenter: BORDRY, Frédérick (CERN)

Session Classification: Opening Session

Contribution ID: **8** Type: **Contributed**

Mapping of the European Research Infrastructures Landscape (MERIL) - A Case Study on Accelerator Facilities

Monday 15 September 2014 16:05 (20 minutes)

It is increasingly recognised that excellent research requires excellent research infrastructures which lead its development in new directions and create an attractive environment for world-class researchers.
The Mapping of the European Research Infrastructure Landscape (MERIL) project is a pan-European effort to produce a comprehensive inventory of research infrastructures of major relevance in Europe across all scientific domains, accessible to the public through an interactive online portal. The project was initially funded for two years (2010-2012) by the European Commission under the coordination of the European Science Foundation (ESF), and is currently supported by the ESF's Member Organisations. The online portal (https://portal.meril.eu/) is available to the community, and current efforts are dedicated to consolidating and expanding the database.
The presentation will address the present status of the MERIL database in particular with respect to accelerators facilities. We will outline the process for the collection of data and present its outcomes with an overview of the information available online. We also propose to discuss with the broad community involved in research, management and funding of accelerator facilitates, on future actions that will facilitate the integration of relevant information into the MERIL database and its effective use by all interested stakeholders. In particular, we will illustrate which kind of evidence - based support the MERIL platform can offer in the identification of stakeholders' needs, assessment and evaluation of infrastructures, optimisation of operations, development of roadmaps, etc. More generally, examples of the use of the MERIL portal to promote individual research infrastructures, encourage cross-border and cross-sector collaboration and education, and a more efficient use of resources within the European research community will be provided.

Presenter: HELMAN, Ana (European Science Foundation)

Session Classification: Opening Session

Contribution ID: **9** Type: **Contributed**

Lessons Learned for Sustainable Research Reactor Utilization: From Knowledge Management to Provision of Products and Services

Monday 15 September 2014 16:45 (20 minutes)

Although the number of operational research reactors (RRs) is steadily decreasing, more than half of them remain heavily underutilized, and in most cases, underfunded. In order to continue to play a key role in the further development of peaceful uses of nuclear technology, the dwindling and rather old fleet of RRs needs to sustain provision of useful products and services to private, national and regional customers, in some cases with adequate revenue generation for reliable, safe and secure facility management and operation. In a context of declining governmental financial support and new requirements related to the improvement of safety and physical security, many RRs have been challenged to generate income to offset increasing operational, maintenance and refurbishment costs, sustain experienced staff and address ageing management issues.

It is clear that, as part of the considerable efforts that are being undertaken by many countries to achieve a greater self-reliance of their RRs, it is necessary to address and consider such aspects as market surveys, marketing plans, business plans and cost of delivery services. At the same time, the present and future potential end users of RR services should be better informed about the capabilities and products that RR can provide.

The IAEA has been continuously assisting its Member States in their efforts to increase RR utilization, provide technical advice and support for the installation/modernization of diverse RR application capabilities, prepare/revise strategic and business plans, and promote RR products and services to their end users. This presentation will provide an overview of the most recent situation regarding RRs world-wide, their issues and challenges. It will also highlight Agency's efforts to acquire and apply methodology, implementation strategies and good practices necessary for the enhancement of RR reactor utilization and sustainability, including major undertakings for implementing new RR projects. It will also provide lessons learned and concrete examples from well-operated and managed facilities that illustrate the successful development of RR user communities and industrial partnerships. When applicable, direct synergies between RR- and accelerator-based facilities will be discussed.

Presenter: RIDIKAS, Danas (IAEA)

Session Classification: Opening Session

Contribution ID: **10** Type: **Contributed**

Fullfilling User Requirements at Synchrotron Light Sources

Tuesday 16 September 2014 09:00 (20 minutes)

Synchrotron light sources (LS) have become the workhorse of research infrastructures all over the world. With more than 70 light sources, each providing several thousands of hours of beamtime per year which allow research to be conducted in multiple areas of science and resulting in several thousands of publications per year, synchrotron light sources have become indispensable research infrastructures.
Synchrotron LS are run as users facilities, meaning that they are open to all potentially interested users and that time allocation is determined by the merit of the proposal. As users facilities they should also run efficiently and serve and adapt to the needs of the scientific community.
The requirements from the users in terms of photon flux, brilliance, photon beam size and beam stability have evolved during the years. Beam sizes of the order of the micron and beam stabilities in the sub-micron range are common requirements for the new light sources.
Fulfilling the requirements of the users has an impact on the design of the light source, not only in terms of reaching the most adequate photon beam properties by using state of the art technology but also in terms of the capital investment and the running cost of a facility. A good balance between the funding and the resources available to run a synchrotron light source and the users requirements to be fulfilled is indispensable to operate successfully a synchrotron light source.
The talk shall discuss the evolution of the users requirements at light sources as well as the recent advances to fulfill the more extreme requirements.

Presenter: PONT, Montse (CELLS-ALBA)

Session Classification: Fulfilling User Requirements at Various Types of Facilities

Contribution ID: **11** Type: **Contributed**

Operation of TIARA Dedicated to R&D on Materials and Biotechnology

Tuesday 16 September 2014 09:20 (20 minutes)

The Takasaki Ion Accelerators for Advanced Radiation Application (TIARA) is an ion beam accelerator complex consisting of a K110 cyclotron and three electrostatic accelerators, which is dedicated to R & D on materials and biotechnology. It provides, for example, microbeams/single-ion hits for irradiation/analysis with high-spatial resolution and scanned/defocused beams for uniform and simultaneous irradiation over a wide area.
Beam times used for these experiments at the cyclotron take several minutes to some hours, veiy shorter than those used for physical study or medical treatment. This specificity characterizes the operation of the TIARA, typically the cyclotron as follows. Beam energy and/or ion species are changed over 200 times every year. More than 30% of about 3200-hours annual operation time is spent for tuning of the ion source and the cyclotron and beam transportation. While the total beam time required by users exceeds twice of the provided one.
The following measures are therefore taken to minimize beam time loss due to troubles at the cyclotron.
* Careful and systematic maintenance scheduled over years to avoid significant troubles.
* Quick recovery from small troubles by well-trained in-house staffs and operators.
* Recording of troubles, their source and recovering measures into a searchable database.
These measures lead to a high ratio of the actual beam time to the scheduled beam time, 99% or higher for recent several years.
A number of technologies on the cyclotron and beam irradiation were developed to meet requirements of users, e.g. shortening of tuning time. The topical technologies are as follows;
* High stabilization of the cyclotron magnetic field resulted in stable beam intensity.
* Quick change of beam energy and/or ion species by cocktail beam acceleration.
* Microbeam formation with 1 pm spatial accuracy for biological irradiation experiments

Presenter: YOKOTA, Wataru (Japan Atomic Energy Agency)

Session Classification: Fulfilling User Requirements at Various Types of Facilities

Contribution ID: **12** Type: **Contributed**

JANNUS at Saclay-Orsay, France: A Multi-Accelerators Facility

Tuesday 16 September 2014 09:40 (20 minutes)

The Joint Accelerators for Nanosciences and NUclear Simulation (JANNUS) project was started in France in 2002 in the frame of collaboration between the French Alternative Energies and Atomic Energy Commission (CEA) and The National Center for Scientific Research (CNRS). Due to the scientific skills developed for a long time, two experimental sites were considered: (1) at Saclay, three electrostatic accelerators, two 3 MV Pelletron machines and a 2.25 MV tandem, are coupled and (2) at Orsay, a 2 MV tandem and a 190 kV ion implanter are coupled together with a 200 kV transmission electron microscope to allow simultaneous co-irradiation and observation.
This multi-irradiation facility is available for single, dual or triple ion beam irradiations in different nuclear and non-nuclear application fields and for national and international projects. Call for beam time is done every year through the French network EMIR (Etudes des matériaux sous irradiation) and in the past through the European project SPIRIT (Support of public and industrial research using ion beam technology).
A description of the Saclay facility will be given with some focus on management. A visit can be also organized.

Presenter: BECK, Lucile (CEA)

Session Classification: Fulfilling User Requirements at Various Types of Facilities

Contribution ID: **13** Type: **not specified**

The Atomki Accelerator Centre: A Complex of Six Low-Energy Accelerators

Tuesday 16 September 2014 10:00 (20 minutes)

During the 60-year history of the Atomki majority of the research have been based on the particle accelerators of the institute. The accelerators served the requirements of the users in different fields of atomic physics, nuclear physics and applications. In the first decades each accelerator belonged to that department which was the main user of the given facility. In 2009 however a new division was established: the Atomki Accelerator Center (AAC). It incorporates staff physicists, engineers and operators (about 20 persons) and 6 low-energy ion accelerators offering the possibility of selecting ions with various charge states, energies and beam intensities. The AAC got into the European MERIL and NUPECC databases.

Accelerator Energy (proton) Particle Start Source
VdG-1 0.1 –1.0 MeV H, D, He 1970 homemade
VdG-5 0.6 - 3.8 MeV H, D, He, C, N, O, Ne 1971 homemade
Cyclotron 5 –18 MeV H, D, He 1985 external
ECR ion source 50 eV - 30 KeV H to Pb, molecules 1996 homemade
Isotope separator 50 eV –50 KeV He, Ne, Ar, N, S, Se 2009 homemade
Tandetron 0.2 - 4 MeV H, C, O 2015 external

The organization of the new AAC changed several many-years traditions. The financing background is henceforward continuously ensured by the academic budget of the institute, while the costs of maintenances and unforeseen repairing are managed by the head of AAC. Beamtimes are requested on-line, opinioned by the Program Advisory Committee and approved by the director. The scheduled and delivered beamtimes are visualized in the internet. According to the AAC policy the applied engineers and operators have to pass several exams (vacuum theory and practice, radiation safety, accelerator theory, accelerator operation etc.). The result is new staff members are now traded to operate 2 or sometimes 3 different accelerators which makes the organization of the shifts (both for technical and human point of views) more economical, flexible and safer.

Presenter: BIRI, Sandor (Institute for Nuclear Resarch (Atomki) Hungarian Academy of Sciences)

Session Classification: Fulfilling User Requirements at Various Types of Facilities

Contribution ID: **14** Type: **not specified**

Systems Engineering at the European XFEL

Tuesday 16 September 2014 10:50 (20 minutes)

Presenter: HAGGE, Lars (DESY)

Session Classification: Business and Management Models for Accelerator Facilities

Contribution ID: **15** Type: **Contributed**

Management Strategies of the iThemba Labs Accelerator

Tuesday 16 September 2014 11:10 (20 minutes)

iThemba Laboratory for Accelerator-Based Sciences (iThemba LABS) is a multi-disciplinary research centre, operated by the National Research Foundation (NRF). It provides accelerator and ancillary facilities for:
- Treatment of cancer patients with energetic neutrons and protons and related research,
- Production of radioisotopes and radiopharmaceuticals for use in nuclear medicine, research and industry and related research, and
- Research and training in the physical, biomedical and material sciences.
iThemba LABS operates three cyclotrons and a 5.5MV Van de Graaff accelerator at Faure, near Cape Town and a 6 MV EN tandem accelerator in Johannesburg, South Africa.
The cyclotrons have been in operation for nearly 30 years. The operational schedule for the cyclotron facility at iThemba LABS is dictated by the users. It is primarily dictated by the beam requirement for patient treatment, followed by the production of isotopes and lastly for beam availability for nuclear physics research. Presently patients are treated during working hours on weekdays and the beam is made available for isotope production after hours. Nuclear physics research is limited to weekends.
The most important figure of merit for patient treatment at an accelerator facility is reliability. It is of utmost importance to deliver quality beam and minimize unscheduled interruptions to ensure that treatment is on schedule. Experience has shown that when unscheduled interruptions increase to more than 10% of scheduled time the medical community loses interest in the facility as a treatment modality.
For isotope production the reliability of the facility is also very important to maximize the amount of the required isotopes that can be delivered on time to all the users. The beam current intensity on the isotope production target is another important figure of merit because it increases the financial income from isotopes. With a 66 MeV proton beam it is possible to produce radio isotopes on tandem targets, thus two targets can be irradiated with the same beam. In addition, to increase the isotope yield even further, a beam splitter was installed in the beam line which allows simultaneous radio nuclide production in two irradiation vaults. It is thus possible to bombard four targets simultaneously.
The nuclear physics fraternity requires a wide variety of beams for their research. The efficiency, reliability and accuracy of the equipment that is required to produce a stable beam with the desired beam characteristics are essential for accurate measurements during experiments. The quality of the beam is essential in the outcome of their experimental research and subsequent number of publications, which serves as an important figure of merit.
Different aspects to ensure reliable operation of the cyclotron facility, which is close to 30 years old, and the Van de Graaff and tandem accelerators which are more than 40 years old will be discussed. The management structure, funding and the aspect of assuring expertise turnover will also be discussed.

Presenter: CONRADIE, Jacobus (iThemba Labs)

Session Classification: Business and Management Models for Accelerator Facilities

Contribution ID: **16** Type: **Contributed**

Technical Management of Hadrontherapy Facilities: What can be Learned from the Last 15 Years

Tuesday 16 September 2014 11:50 (20 minutes)

Introduction

The rationale on potential advantages for using protons or carbons ions in radiation oncology was formulated in1946. However, the size and cost of accelerators required has postponed the launching of this field to the end of the 20th century. Since the last 15 years, many facilities have been projected, built and are now in operations [1]. After a first set of large facilities, comparable to research facilities, the general trend is going to compact and more effective-cost facilities. The therapy facilities have to conciliate several issues: pressure to treat the patients during the slots scheduled, safety of the treatment process, and requirements to upgrade the beam delivery systems and the associated software.

Materials & Methods

The Centre de Protonthérapie d'Orsay (CPO), was primarily based on an old Nuclear Physics facility with a synchrocyclotron. First treatments start in 1991. During the period 2006-2010 a project of modernization and extension of the facility was achieved by an industrial consortium IBA-BESIX. Since 2010, the facility includes an industrial cyclotron (230 MeV) and a modern gantry treatment room. This project was achieved in close cooperation with many other Particle Therapy centres (as PSI in Villigen-CH or MGH in Boston-USA).
The project and the operations has been built and lead in relation with several national authorities: ARS (Agence de Santé Régionale) for medical issues, ASN (Autorité de Sûreté Nucléaire) for radiation protection and Quality Assurance of the treatment process.
Many methods and task forces have been deployed to this manage this multi-constraints field: method LEAN to improve the workflow of patient and the associated process, upgraded monitoring to promote adaptive maintenance, SCRUM for the development of software, ⋯.

Results

In term of medical results, Protontherapy has now clearly shown its advantages for some eye treatments and for some head&neck tumours. The pertinence of this modality for pediatrics [2] is recognized by the community and must be now confirmed by the results of trials. Many others protocols (breast, lung, ⋯) are presently opened and in evaluation.
In term of technical management, the majority of the projects has faced tremendous difficulties to reach the milestones (delays, budgets) previously scheduled. Projects previously based on P.P.P. (Public-Private Partnership) have been cancelled or reshaped.
A significant number of facilities (50) are now in operations worldwide and a new generation of compact solutions is now coming.

Discussions

In term of technical management, the case of Particle Therapy facilities open several questions: level of innovation admissible for a high-availability facility, long-term cost and management of service contracts, interface with medical users, management of staff with mixed activities operations/maintenance/R&D, interface with industrials, ⋯

Presenter: MEYRONEINC, Samuel (Institut Curie Centre de Protontherapie)

Session Classification: Business and Management Models for Accelerator Facilities

Contribution ID: **17** Type: **Contributed**

Maintenance Strategies in Accelerator Facilities

Tuesday 16 September 2014 11:30 (20 minutes)

Accelerator facilities are being increasingly compelled to professionalize their maintenance activities to take into account the constraints and growing challenges facing them: enhanced service requirements, technological complexity of equipment, regulatory compliance, financial constraints and a growth in personnel outsourcing activities, etc. Establishing a maintenance strategy is therefore of paramount importance to allow control of risks, improve the reliability and availability of equipment, provide greater flexibility in managing the installations, reduce costs and facilitate financial accounting and reporting; all parameters that contribute to the excellence of the facilities reputation.
The know-how and the high level of expertise in the area of assets and maintenance management, generated during long lasted operation around accelerator facilities, are still immature and not completely identified. Driving change in this area is complicated and a long lasting process.
Given the difficulties encountered in this field, accelerator facilities have taken the initiative to share their experiences and exchange ideas. SOLEIL took a pioneering step in this direction by hosting the first workshop "Assets and Maintenance Management" in 2011 and CERN organized the second edition of the workshop in 2013.
The presentation will address the following points: the need for a maintenance strategy based mainly on sharing common methods and work procedures; difficulties in implementing this methodology, for reasons related to culture (change of work habit), to the organization (often decentralized management with maintenance done trade by trade) and to manpower. An overview of existing practices in different accelerator facilities will also be outlined.

Presenter: ROZELOT, Hélène (Synchrotron Soleil)

Session Classification: Business and Management Models for Accelerator Facilities

Contribution ID: **18** Type: **Contributed**

Quality Control: An Option for the Management of Small Scale Accelerator Facilities

Tuesday 16 September 2014 12:10 (20 minutes)

Research laboratories, no matter what their size is, require more and more attention to the work organization, to the effectiveness of the technical procedures, to the traceability of the operations, to the interaction with users. All these actions will, at the end, result in an optimal benefits/cost performance, absolutely relevant in determining the impact of each laboratory on its reference community and the effectiveness of the use of the associated (public) investment. Casting of the work procedures into a Quality Management System (QMS) can allow the laboratory management to achieve the above stated. Although it is not the only possible option it certainly is a powerful and motivating one, tested moreover in millions of equivalent cases around the world. The respect of a norm, like the ISO 9001:2008 (soon to be replaced by the ISO 9001:2015), can facilitate the construction of a very efficient working framework. On the other side, the certification by an independent authority is a guarantee for the funding agencies and for the laboratory user of the quality of the service provided by the laboratory. In the case of a public university laboratory, the use of which is fully open and competitive, this is particularly true as regards the equal opportunity of access for all potential users and the traceability of the peer review process that leads to access granting. The crucial point is to set very carefully the balance between the advantages that a QMS can provide and the investment in terms of human and economic resources that the implantation and maintenance require.
We will address these points using the experience gained from the QMS, built around the "Delivery of ion beams", implanted and maintained at CMAM since three years, as a result of convinced and strong move towards quality assurance made a few years ago both by the Universidad Autónoma, to which the CMAM belongs, and by the Public Laboratories Network of the Madrid community, of which the CMAM is member.

Presenter: ZUCCHIATTI, Alessandro (Universidad Autonoma de Madrid)

Session Classification: Business and Management Models for Accelerator Facilities

Contribution ID: **19** Type: **Invited**

R&D for Optimum Operation Cost Focused on the Infrastructure

Tuesday 16 September 2014 14:00 (30 minutes)

Presenter: MIRALLES VERGE, Lluis Secundino (CERN)

Session Classification: R&D for Optimizing Costs of Operation

Contribution ID: **20** Type: **Contributed**

Initial Operations Plans for the ESS

Tuesday 16 September 2014 14:30 (20 minutes)

The European Spallation Source (ESS) is planned to be the world leading source of slow neutrons for neutron scattering experiments in physics, chemistry, materials and engineering sciences etc. The facility will aim at a two orders of magnitude performance improvement compared to present facilities in Europe and has a scope of a 5 MW, 2 GeV proton Linac for long (ms) pulses, a Target Station for neutron production and set of 22 Instruments for scientific experiments. ESS is planned to be built in the period 2014-2019, with hot commissioning of the Linac during 2019, producing the first neutrons at the end of that year, and expecting to provide 1 MW of power for neutron production at the end of2021, with only a part of the superconducting Linac installed. After installation of the remaining part of the Linac, the power would ramp up during the initial operation phase, reaching 5 MW by 2025. During this period, the neutron instruments will be installed and commissioned. The initial scientific experiments are planned for 2021, starting with 2-3 instruments in 2021, increasing to 6-7 in 2022. The Steady-state operation of the ESS facility will start in 2026, with routine operations and commissioning of the final public instruments, to reach the baseline suite of 22 neutron instruments in 2028. This paper presents the plans currently being developed at ESS in order to provide a successful transition from construction to steady state operations focusing in particular on the steps required for a high availability of the installation and the delivery of scientific performance to the users. Another important aspect in the operation of ESS is the energy concept, with the challenge to reduce the energy use of the facility, using energy from renewable sources and recycling the heat produced during operation.

Presenter: MUNOZ ALFONSO, Marc (European Spallation Source (ESS))

Session Classification: R&D for Optimizing Costs of Operation

Contribution ID: **21** Type: **Contributed**

Optimizing Cost of Operation and Extension Accelerator Facility Exploitation Period

Tuesday 16 September 2014 14:50 (20 minutes)

More than 1500 electron accelerators have been used as intense source of ionizing radiation for implementation in industry a number of radiation technologies, like modification of polymers, semiconductors, radiation sterilization as well as for environmental protection. Cost reduction is one of the key factors of successful radiation technology implementation. Annual cash flow projections based on annual fixed and variable costs evaluation is very useful to recognize accelerator facility economical condition.
Capital costs including site preparation and accelerator installation should be accounted for assuming a fixed interest rate and amortization the capital cost for the life time of the facility. Annual fixed cost related to accelerator facility exploitation should be evaluated just after formulation radiation process parameters including physical parameters of irradiated object (dimensions, density), dose rate and process capacity. Accelerator selection (price vs. performance) can be performed only when required electron energy and beam power is established. Additionally part of variable cost related to spare parts cost necessary for certain accelerator construction should be taken into account as well. Expenses related to the spare parts could be significant component annual variable cost of facility operation. The cost of single microwave device like klystron or magnetron could be the best example.
Possible choice of modulator design is related to decision which pulse power switch technology will be used: thyratron or modern semiconductor switch. In general well establish technology or new development which offers better performances. The second selection is usually connected with much higher risk of failure in longer exploitation period. It refers to not only certain accelerator components but also to new accelerator design which has not been proved during intense exploitation. When accelerator is use continuously as industrial source of ionizing radiation the regular maintenance procedures are necessary and very well qualified service personnel. The facility personnel or outside service, performed usually by accelerator manufacturer, should be evaluated regarding effectiveness and money involved.
Upgrading existing accelerator facility could be performed due to maximizing its capacity, elimination weak components or systems or replacing not more available spare parts to prolong accelerator exploitation period. All these activity should be carefully evaluated due to technical feasibility and economical effectiveness regarding cost - performance relation.

Presenter: ZIMEK, Zbingiew (Institute of Nuclear Chemistry and Technology, Warsaw)

Session Classification: R&D for Optimizing Costs of Operation

Contribution ID: **22** Type: **Contributed**

Ion Beam Analysis and Remote Accelerator Operation

Tandem accelerator facility of the Ruđer Bošković Institute is the largest research infrastructure in Croatia. It consists of two electrostatic tandem accelerators (1.0 and 6.0 MV), which, with available ion sources, provide a wide range of ion beams and their respective energies. Various end stations distributed at nine beam lines, including the dual beam irradiation scattering chamber, enable performance of experiments in many basic and applied research areas. Furthermore, facility has important position in its use for education and training as well as in services provided for public and industrial partners.

Modern capabilities offered by the computer control of the facility and user-friendly system for experiment control and data acquisition, significantly increased the possibility of accelerator utilization. Until today remote accelerator operation was used in many cases.

The use of the remote access to ion beam analysis capabilities and in particular for PIXE and RBS has been demonstrated several times during the training courses organized in other countries, including those organized by IAEA from its Seibersdorf site. Also, external users who are already familiar with RBI facility, but were not capable to travel to facility have also performed several remote experiments. In those cases users'test samples were send to Zagreb, where responsible person installed them into the chamber and assisted remote experimenter to perform the measurements. Off-line versions of the software offer to experimenter possibility to complete data evaluation without necessity to use local computing facilities. Not less important are also examples of remote access that are related to the lack of expertise of users that perform experiments on site. In many circumstances it happened that experienced accelerator operator tuned the accelerator without being personally present in the facility, sometimes even from abroad. All these examples will be reviewed in the context of possible reduction of costs and better accelerator utilization.

Presenter: JAKSIC, Milko (Ruder Boskovic Institute)

Contribution ID: **23** Type: **Invited**

A Common Operation Metrics for Third Generation Light Sources

Wednesday 17 September 2014 09:00 (30 minutes)

High reliability is a very important goal for third generation light sources. Very often the beam availability and the mean time between beam outages are used as an operation metrics to measure the reliability of the accelerator. A survey at different 3rd generation light sources revealed that the calculation of the beam availability and the mean time between beam outages does vary significantly between facilities. This does prevent a useful comparison of the reliability of these accelerators. The authors propose a specific metrics for the reliability of 3rd generation light sources; a metrics that will allow a detailed and meaningful comparison of these particle accelerators.

Presenter: BIELER, Michael (DESY)

Session Classification: Performance Indicators and Figures of Merit for Accelerator Facilities

Contribution ID: **24** Type: **Contributed**

The Centre for Accelerator Science at ANSTO, Sydney, Australia

Tuesday 16 September 2014 15:10 (20 minutes)

The Australian Nuclear Science and Technology Organisation (ANSTO) has a long history of running linear positive ion accelerators to complement its nuclear reactor research program. The first accelerator was a 3 MV Van de Graaff accelerator arriving at ANSTO in January 1964 from High Voltage Engineering Corporation (HVEC) in the USA. This machine was purchased for fast neutron cross section and capture studies, the study of subcritical assemblies using pulsed neutrons, gamma free neutron dosimetry and health physics research. By 1970 this accelerator had a national reputation, the number of separate beamlines had increased to 10 and the accelerator was operating over 6,000 hours a year running experiments driven by internal research as well as major groups of external users from most of the 25 universities around Australia.
By the mid 1980's the applied research program, using the accelerator had expanded to the point where new and more diverse accelerators were required to fill the ever increasing demand both nationally and internationally. In 1989 ANSTO acquired a second hand 10MV HVEC FN tandem from Rutgers in the USA to fill this expanding demand for ion beam analysis (IBA) and accelerator mass spectrometry (AMS) research. Then in October 2002, ANSTO purchased another 2MV Tandetron from HVE to meet the increasing IBA and AMS requirements and to replace the now aging 3MV Van de Graff accelerator. The national need for access to accelerators for applied research continues to grow within Australia and in May 2009 the Federal Government allocated a further $25M to ANSTO for accelerator research. This enabled ANSTO to build and develop its new$ 38M Centre for Accelerator Science (CAS). CAS now has four accelerators, a 1MV, 2MV, 6MV and 10MV accelerators for applied research focused on environmental, materials and life science research.
Here we will discuss, in detail, the performance indicators and figures of merit for these accelerators and how they have changed with time in response to external demands.

Presenter: COHEN, David Damien (Australian Nuclear Science and Technology Organisation (ANSTO))

Session Classification: R&D for Optimizing Costs of Operation

Contribution ID: **25** Type: **not specified**

Perfomance Indicator in Spallation Source

Wednesday 17 September 2014 09:30 (20 minutes)

Presenter: MUNOZ ALFONSO, Marc (European Spallation Source (ESS))

Session Classification: Performance Indicators and Figures of Merit for Accelerator Facilities

Contribution ID: **26** Type: **Invited**

Operation Experiences of the Japan Proton Accelerator Research Complex (J-Parc)

Wednesday 17 September 2014 11:00 (30 minutes)

Japan Proton Accelerator Research Complex, J-PARC, is an intemational user facility consisting of high intensity three proton accelerators, namely a linac, a 3-GeV synchrotron, and a 50-GeV synchrotron, and three experimental facilities, Materials and life science experimental facility with neutron and muon, Hadron experimental facility with kaon, and Neutrino experimental facility with neutrino, where cutting-edge researches encompassing from academic use to industrial applications. J-PARC is now operated by jointly two organizations, High Energy Accelerator Research Organization (KEK) and Japan Atomic Energy Agency (JAEA).
J-PARC construction had started in April 2001 and had finished in the end of 2008 as the Phase-I with a budget of more than 150 billion yen. Since 2009, all three experimental facilities had been operated currently with a proton beam power of around 300 kW. (1MW is the design goal.) It has passed around six years in which included about one year shut down due to the Great East Japan earthquake occurred in March 2011.
Conquering difficulties, exciting scientific results have been produced such as physics finding of new results for electron neutrino appearance in T2K collaborative experiment. This paper is to overview the J-PARC and to report six-year operation experiences including management experiences for recovery from the earthquake damage along with other incidents, which have impacted to the facility management.

Presenter: IKEDA, Yujiro (J-PARC Center)

Session Classification: Case Studies

Contribution ID: **27** Type: **Contributed**

Lessons from the Proton Engineering Frontier Project

Wednesday 17 September 2014 11:30 (20 minutes)

We had recently completed the Proton Engineering Frontier Project (PEFP) and established the Korea Multi-purpose Accelerator Complex (KOMAC) in 2012. Launched in 2002 as a 21st Century Frontier R&D Program of Korea government, the primary goal of the PEFP was to develop a high-intensity 100-MeV, 20-mA proton linear accelerator in order to be utilize proton beams in scientific, medical, and industrial R&D. Second and third goals of the project were to foster proton beam user community in various fields and to explore industrial applications of accelerator technology, respectively. Upon completion of the PEFP, the KOMAC, as a satellite laboratory of Korea Atomic Energy Research Institute (KAERI), started operations of the 100-MeV proton accelerator and several ion implanters in 2013.
In this presentation, we review the PEFP, from its planning stage to completion, focusing lessons from the management to complete the three major missions of the project with limited resources. Unexpected issues and their influences are to be noted for references for the on-going or future big-science project. (This work was supported by the Ministry of Science, ICT and Future Planning of Korea.)

Presenter: KIM, Kui Young (Korea Atomic Energy Research Institute (KAERI))

Session Classification: Case Studies

Contribution ID: **28** Type: **Contributed**

The CNAO Synchrotron: Design, Operation and Organization

Wednesday 17 September 2014 11:50 (20 minutes)

Hadrontherapy offers an improved dose conformation to the target volume as compared to photon radiotherapy, with better sparing of normal tissue structures close to the target. In addition, carbon ions beams exhibit an increase of the radio biological efficacy, RBE, in the Bragg peak as compared to the entrance region.
The CNAO (National Center for Oncological Hadrontherapy) is the first Italian center for deep hadrontherapy. The main accelerator is a synchrotron capable to accelerate carbon ions up to 400 MeV/u and protons up to 250 MeV. Three treatment rooms are available and are equipped with horizontal beam lines; one of the treatment rooms also features a vertical treatment line to allow additional treatment ports.
The CNAO facility, has been designed for a completely active beam delivery system, in which a pencil beam is scanned transversely and the extracted beam energy can be changed on a spill to spill basis to obtain the best possible 3D dose conformation to the tumor.
The CNAO injector is composed of two ECR sources with a combined transfer line that brings the beam to a unique RFQ/LINAC system which accelerates the beam to 7 MeV/u for injection into the synchrotron.The commissioning of the synchrotron started in August 2010 and the first patient was treated in September 2011. Since then the clinical activities have been carried out on a regular basis and require regular availability of the beam in the treatment rooms.

Presenter: PULLIA, Marco Guiseppe (Fondazione CNAO)

Session Classification: Case Studies

Contribution ID: **29** Type: **Contributed**

CMAM, Starting from Scratch: Our Experience on how to get Experienced

Wednesday 17 September 2014 12:10 (20 minutes)

The Centre for Micro-Analysis of Materials (CMAM) was inaugurated in 2003 in Spain, a country with almost no experience in the field of electrostatic accelerators (the first one dates from 1999). At that moment, with this lack of national knowhow facing the day-to-day operation and maintenance problems was only possible with the support from the manufacturer and the casual interaction with our colleagues from abroad.
Since then, the technical staff of CMAM have been developing the skills needed not only for running the facility but also to improve it, achieving a higher degree of autonomy. A review of the policies applied in such direction, with examples of their impact on the way the accelerator is run and how new instrumentation has been developed or improved will be presented.

Presenter: MUNOZ MARTIN, Angel (Universidad Autonoma de Madrid)

Session Classification: Case Studies

Contribution ID: **30** Type: **Invited**

Brazilian Synchrotron Light Laboratory - LNLS: from Scratch to a State-of-the-art Machine in 30 Years

Wednesday 17 September 2014 14:10 (30 minutes)

The first discussions to build a synchrotron light source in Brazil started in the early SO's. At that time, Brazil had no knowledge in either building or operating a synchrotron machine. Moreover, only a handful of researchers in the country had already used a synchrotron somewhere else in the world. Strategies were taken both to train young physicists, engineers and technicians in the different fields needed to build a synchrotron accelerator and its beamlines, as well as to educate researchers for their usage. The overall design and construction of UVX, the name of the Brazilian second generation machine, took from 1987 up to 1997, when it was opened to users. It was the first synchrotron light source in the southern hemisphere, as it is still today the only one in Latin America. It opened with 7 beamlines, and it evolved to have 18 today. The number of users grew from less than two hundred to more than a thousand per year. They come today from a community of almost 3.OÖ0 users that have at some point visited LNLS. The development of such a community placed a natural demand for a better machine. Thus, LNLS started to work on a project of a new synchrotron light source. The first proposal to initiate the studies of such a machine was presented to the Minister of Science and Technology in 2008. From then on many developments were made, and today Sirius, the nickname of the new synchrotron, is starting to become a reality. It is a very challenging light source, designed to have one of the highest brightness among the 3 GeV synchrotron sources in the world. Construction of the building is planned to start by the end of 2014, and the first beam is expected by 2018.

Presenter: ROQUE DA SILVA, Antonio Jose (Laboratorio Nacional de Luz Sincrotron - LNLS)

Session Classification: Case Studies

Contribution ID: **31** Type: **Invited**

The COSY Facility at Jülich: New Accelerator Design and Possible Applications

Wednesday 17 September 2014 10:30 (30 minutes)

During the past 20 years, the Cooler Synchrotron COSY of the Research Center Jülich provided polarized proton and deuteron beams up to energies of 2.88 GeV. Collaborations like COSY11, ANKE, WASA, PAX and TOF used its unique features like phase-space cooled beams of small emittance and polarized internal targets. Based on this experience several new projects are presently being developed:
1.) The JEDI collaboration is working on the design of a new type of a primarily electrostatic storage ring to measure the electric dipole moments (EDM) of protons and deuterons with an extraordinary precision. This technique will allow reducing the running costs of a storage ring in the energy range of several 100 MeV, thereby opening a window into new physics beyond the standard model, with the potential to explain the dominance of matter over antimatter in our universe. In addition, in order to achieve the required precision, novel beam diagnostic tools based on SQUIDs and Laser Compton backscattering are required.
2.) The proposed Jülich Short-Pulsed Particle and Radiation Center (JuSPARC) will be an interdisciplinary center for collaborative research with ultra-short pulsed photons as well as fast or thermal neutrons and polarized MeV-ion beams. These beams, which can be used for condensed matter physics, material science, structural biology and plasma/fusion physics, will be generated employing the radiation from a high-power (up to few Petawatts, i.e. 1015 W), short-pulse laser (pulse durations in the 10 fs range). In combination with the COSY accelerator the Laser-accelerated (polarized) beams can be employed for nuclear physics experiments.
3.) If the spins of the fuel particles in nuclear fusion are aligned parallel the cross section is increased by a factor of 1.5. This effect can be used to increase the energy output of a fusion reactor by at least a factor of two. In addition, the design of a fusion reactor might be simplified, because the choice of the nuclear spins allows one to control the neutron trajectories. But before polarization is an option to optimize the efficiency of a fusion power station a long list of questions must be answered.

Presenter: ENGELS, Ralf (Institut für Kernphysik Forschungszentrum Jülich)

Session Classification: Case Studies

Contribution ID: **32** Type: **Contributed**

Establishment and Development of Thailand Synchrotron Light Source

Wednesday 17 September 2014 14:40 (20 minutes)

Establishing and operating a synchrotron light source in a developing country such as Thailand poses a set of unique challenges. The facility, which was established in the year 1998, began with the relocation of an old synchrotron machine used for lithography from Japan. While the booster synchrotron was kept intact, the storage ring was redesigned to be more suitable for synchrotron radiation researches, namely, reducing electron beam emittance and beam size to generate higher brightness synchrotron light, as well as doubling the size of the ring to accommodate more photon beamlines. The photon beamlines were gradually constructed and commissioned. From merely one photon beamline back in 2003, now the light source has 8 beamlines in operation, with 2 more under commissioning, and another 2 under construction. With improved beam diagnostics, the positional stability of the electron beam was greatly improved in 2012. Last year two high-field insertion devices were installed to extend the available radiation spectrum to higher energy X-ray region (up to 20 keV). Since the time of facility construction, there are a number of rather unique difficulties that have to be overcome. First and foremost is the fact that the country did not possess sufficient level of expertises related to advanced technology. These include ultra-high vacuum technology, cryogenics, precision machining, and high-precision control system, among others. The facility needed to develop these aforementioned capabilities by itself from the ground up. Time was needed to develop both requisite infrastructures and human expertises. A small number of domestic researchers familiar with synchrotron radiation techniques posed another obstacle. This problem was alleviated by organizing outreach and training programs. Finally, limited funding was and continues to be a challenge. Experiences gained in setting up Thailand Synchrotron may prove to be valuable to other countries under similar circumstances.

Presenter: KLYSUBUN, Prapong

Session Classification: Case Studies

Contribution ID: **34** Type: **not specified**

Visit of the AGLAE Facility

Wednesday 17 September 2014 18:00 (1 hour)

http://www.c2rmf.fr/analyser/un-laboratoire-de-haute-technologie-pour-les-collections-des-musees/aglae

Installed in 1989 in the premises of the Louvre museum; the AGLAE accelerator managed by the French Ministry of Culture in association with the Centre National de la Recherche Scientifique is the only of its type dedicated to the study of Cultural Heritage objects. Because Cultural Heritage artifacts are precious and unique, they cannot be sampled nor placed under vacuum and can only be analysed using an external beam. This explains the continuous improvement for 20 years and in particular the major upgrade that the facility is being undergoing through the program called NEW AGLAE.

The objective is to implement a multipurpose external beam line with superior performance in terms of spatial resolution, beam stability and multi-particle detection with respect to the previous setup. A tenfold increase in X-ray detection efficiency enables to use low intensity beams, thus reducing the risk of damage to sensitive artworks. In parallel, a new scanning system combining beam deflection and sample translation enables the chemical imaging of areas extending mm to tens of cm.

The use of the AGLAE facility has been offered to researchers from the European heritage community through a transnational access for more than 10 years (Eu-ARTECH, CHARISMA).

Registration for the AGLAE facility visit will be available on 15 September 10:00-11:00 during the technical meeting “Registration”session.

In case you wish to communicate your planned visit in advance, please contact:

Dr. Claire PACHECO - claire.pacheco@culture.gouv.fr
Dr Thomas CALLIGARO - thomas.calligaro@culture.gouv.fr.
Dr Michel MENU - michel.menu@culture.gouv.fr

Contribution ID: **35** Type: **Contributed**

Accelerator Science at the University of Manchester Dalton Cumbrian Facility

Thursday 18 September 2014 09:00 (20 minutes)

The University of Manchester's Dalton Cumbrian Facility (DCF) is a new radiation science research centre created in partnership between the University and the nuclear energy industry. DCF incorporates large scale irradiation capability together with high-end material preparation and post-irradiation examination facilities. The primary research aim is to develop a mechanistic understanding of radiation-induced effects and chemical processes to allow a predictive description of materials degradation in nuclear environments.
A central component of the DCF is a 5 MV tandem ion accelerator, dedicated to the challenges faced in dealing with the nuclear legacy and meeting future energy needs. The accelerator, a Pelletron system supplied by National Electrostatics Corporation (NEC), produces Mz+ ions with energies up to 5(Z+1) MeV for both light and heavy ions. DCF incorporates 6 beamlines split between two separate target vaults to allow maximum experimental flexibility. A second accelerator, a 2.5MV light-ion system, will be installed at DCF during 2015 to create a dual beam accelerator system that will expand research capability in materials for next generation reactors.
We will present an outline of the DCF research program and the existing and future capabilities of the DCF accelerator and beamlines in addressing these interests. The presentation will include case studies of recent experiments conducted with the ion beam accelerator and conclude with the planned expansion of experimental capability at DCF to support future research programs, designed to underpin national and international nuclear energy strategies.

Presenter: WARREN, Kevin (The University of Manchester)

Session Classification: Case Studies

Contribution ID: **36** Type: **not specified**

TIARA: Coordination of Accelerator R&D in Europe

Thursday 18 September 2014 09:20 (20 minutes)

Presenter: ALEKSAN, Roy (CEA)

Session Classification: Case Studies

Contribution ID: **37** Type: **Invited**

SESAME Success Continues Despite Difficulties

Friday 19 September 2014 09:00 (30 minutes)

SESAME (Synchrotron-light for Experimental Science and Applications in the Middle East) is a third generation 2.5 GeV synchrotron-light source under construction near Amman (Jordan), modelled on CERN and established under the auspices of UNESCO. The Members of SESAME are currently Bahrain, Cyprus, Egypt, Iran, Israel, Jordan, Pakistan, the Palestinian Authority and Turkey. Observer countries are Brazil, China, France, Germany, Greece, Italy, Japan, Kuwait, Portugal, Russian Federation, Spain, Sweden, Switzerland, UK, and USA. Jordan was selected as the seat of the project in April 2000 and SESAME became a center operating under the auspices of UNESCO in May 2002 and developed to an independent multinational research organization in April 2004.
SESAME has faced many difficulties since its start. Most of the difficulties were financial; however some were also political and technical. Despite all difficulties, SESAME managed to move forward on constructing the machine and building staff capacity. SESAME building was completed in 2007 and commissioned in November 2008. The shielding tunnel that would host all the three accelerators was completed in April 2011. The first beam was produced from the microtron at 22 MeV in November 2011. The cooling and vacuum system were completed in March 20013. Despite the severe accident of roof collapse due to unprecedented snow fall in mid-December 2013, a 20 MeV beam was stored in the booster in July 2014. On the 3rd September, 2014 the SESAME team succeeded in accelerating the electrons in the booster to their final energy of 800 MeV. This makes SESAME booster the first high-energy accelerator in the Middle East.
Storage ring magnets are being manufactured with help from CERN and a €5 million donation from the European Commission. Four RF cavities are currently manufactured at ELETTRA which will be partly paid for by a €1 million donated by Italy. SESAME is expected to go on operation early 2016 with 4 day-one beamlines.
SESAME achievements can be attributed to the high skills of its staff from several countries and the help and support SESAME is receiving from several light source laboratories around the world. Many laboratories and international organizations helped in staff capacity building, donation of equipment, parts, complete beamlines and expertise.

Presenter: TOUKAN, Khaled (JOR02 - Jordan Atomic Energy Commission (JAEC))

Session Classification: Case Studies

Contribution ID: **38** Type: **Contributed**

European Research Platform IPANEMA

Friday 19 September 2014 09:30 (20 minutes)

CNRS, the French ministry of Culture and communication and Synchrotron SOLEIL have built IPANEMA, the European research platform on ancient materials at the site of the synchrotron facility. IPANEMA develops advanced methods of material characterisation in archaeology, palaeoenvironments, palaeontology and cultural heritage research, and supports synchrotron users through external projects hosted at the platform. This contribution will focus on some of the critical aspects connected to responding to the demand from user requests and facility management. Such interdisciplinary development raises new questions and leads to original responses of a more general interest in the context of the development of accelerator facilities, and that of networks of instruments devoted to specific field of research such as, in our case, the study of ancient materials.

[1] L. Bertrand, M. Cotte, M. Stampanoni, M. Thoury, F. Marone, S. Schöder. Development and trends in synchrotron studies of ancient and historical materials. Phys. Rep., 519(2):51–96, Oct 2012.
[2] L. Bertrand, M.-A. Languille, S. X. Cohen, L. Robinet, C. Gervais, S. Leroy, D. Bernard, E. Le Pennec, W. Josse, J. Doucet, S. Schöder. European research platform IPANEMA at the SOLEIL synchrotron for ancient and historical materials. J. Synchrotron Rad., 18(5):765–772, 2011.
[3] L. Bertrand, L. Robinet, M. Thoury, K. Janssens, S. X. Cohen, S. Schöder. Cultural heritage and archaeology materials studied by synchrotron spectroscopy and imaging. Appl. Phys. A, 106(2):377–396, Feb 2012.

Presenter: BERTRAND, Loic (CNRS)

Session Classification: Case Studies

Contribution ID: **39** Type: **not specified**

Registration (Coffee and Tea will be served)

Monday 15 September 2014 10:00 (1 hour)

Contribution ID: **40** Type: **not specified**

Visit of the Synchrotron Soleil Accelerator Tunnel

Monday 15 September 2014 11:40 (1h 5m)

Contribution ID: **41** Type: **not specified**

Dinner at Musee d'Orsay

Thursday 18 September 2014 18:30 (3h 30m)

Registration for the dinner will be available on 15 September 10:00-11:00 in the "Registration" session.

Contribution ID: **42** Type: **not specified**

Visit of JANNUS Facility (register by Sept 04)

Friday 19 September 2014 14:00 (1h 30m)

(http://jannus.in2p3.fr/) is a multi-ion beam irradiation platform jointly managed by the "Commissariat à l'énergie atomique et aux énergies alternatives" (CEA), the "Centre National de la Recherche Scientifique" (CNRS) and the "Université Paris-Sud 11" (UPS).
At CEA Saclay (http://jannus.in2p3.fr/spip.php?rubrique13), a triple ion beam facility allows the simultaneous production by ion beams of nuclear recoil damage and implantation of a large array of ions for well-controlled modelling-oriented experiments. The facility is operating according to three modes: i) single beam (for IBA measurement and implantation/irradiation), ii) dual and iii) triple beam (for implantation/irradiation). JANNUS is designed to supply a large range of ion irradiation and implantation conditions with single, dual or triple beam combinations, in-situ Transmission Electron Microscopy (TEM) in Orsay or Raman spectroscopy in Saclay. Such a facility has no equivalent in Europe.

A visit of the facility in Saclay is proposed on Friday afternoon for 15 max. participants.
TM participants who are interested in the visit should directly contact the head of the JANNUS Facility : Dr. Lucile Beck (lucile.beck@cea.fr) and provide the following information before 4th of September:

NAME :
First NAME :
Birth date :
Birth place (city + country) :
Nationality :
Address :
Profession :
Employer :

Contribution ID: **44** Type: **Poster**

Bulgarian National Cyclotron Center

Tuesday 16 September 2014 15:30 (1h 30m)

The Institute for Nuclear Research and Nuclear Energy has successfully operated the first and only research reactor with scientific experimental base in Bulgaria during several decades. During the most active period of the research reactor, wide range of radioisotopes have been produced, such as 18F, 42K, 24Na, 35S, 45Ca, 51Cr, 59Fe, 60Co, 64Cu, 82Br, 86Rb, 90Y, 142La, 169Yb, 182Ta, 192Ir, finding their applications in industry and medicine. Shutting down of the research reactor left Bulgaria without local production of radioisotopes, and with limited possibilities for R&D and education in the field of radiochemistry and radiopharmacy.
Therefore the directors of the INRNE took the decision to create "National Cyclotron Center at INRNE-BAS"with the following goals: ensuring the growing needs in Bulgaria and the Balkans of radiopharmaceutical products for imaging diagnostics of cancerous diseases; creation of modern base for basic education of specialists for the nuclear energy and nuclear medicine; creating new generation of scientists to perform research in nuclear energy, nuclear physics, radiopharmacy, radiopharmaceutical chemistry, radioprotection and safety, radiobiology, etc. A new infrastructure will be built within INRNE-BAS, consisting of: specialized building, answering the regulations and standards for radiation safety and GMP in the pharmaceutical industry, vault with cyclotron accelerator for charged particles, R&D and innovations sector also with education purposes, sector for production of 18F-FDG and in future - of other radiopharmaceuticals. INRNE will buy a cyclotron with energy of the proton beam of 24-30 MeV, which will allow us to produce wide range of radioisotopes in the next 20 years, such as PET isotopes - 18F, 124I, 64Cu, 68Ge/68Ga and SPECT isotopes - 123I, 111In, 67Ga, 99mTc, as well as alpha-emitters - 225Ac/213Bi, 230U/226Th. This will create an opportunity for successful restart of the R&D activities in the field of radiopharmacy. This is a complex and large scale project, aiming at infrastructure and capability development in the area of nuclear technology, techniques and applications, and involving a strong component on procurement of equipment as well as human resources.
This presentation is contributing to the session Case studies, topic k) Explore different paths for new facility establishment.

Presenter: MINEVA, Milena Nikolaeva (Institute for Nuclear Research and Nuclear Energy - Bulgarian Academy of Sciences)

Session Classification: Poster Session

Contribution ID: **45** Type: **Poster**

TAEA Proton Accelerator Facility, Objectives and Capabilities

Tuesday 16 September 2014 15:30 (1h 30m)

The main goal of Turkish Atomic Energy Authority (TAEA) is to enhance the use of products of nuclear technology by acquiring it for the utmost benefits of Turkey. Within mentioned frame; the accelerator technology is also a good tool to be implemented nuclear technologies for the utmost benefits of Turkish Nation. It is known that; the accelerators play a central role in medical applications such as radioisotopes/radiopharmaceuticals production to be used nuclear medicine, heavy ion treatments at cancer cure studies and scientific studies ranging from biology to health, from material science to metallurgy, from fundamental particles to universe.
In order to achieve this main goal, The Proton Accelerator Facility (PAF) was established at Sarayköy Nuclear Research and Training Center (SNRTC) of TAEA in Ankara on 2012. By the commissioning of TAEA-PAF, being a multi-purpose facility, an infrastructure for accelerator technology with an integral type of facility that is designed for radioisotope and radiopharmaceutical production, quality control and research and development have been established in Turkey for the first time. Eventually various institutions in our country in the field of medicine and research is benefit from this Facility, which is a unique type of its kind.
As briefly TAEA PAF comprises; a proton accelerator (CYCLONE 30 designed by Ion Beam Application S.A.-Belgium) with energy of 15 30 MeV and proton current of 1.2 mA (maximum), four beam transport lines which three of them are used for radioisotope production (for PET and SPECT) from different kind target (liquid, gas and solid) systems and one of them could be used for research activities and related production and quality control laboratories.

Presenter: YUKSEL, Alper Nazmi (Turkish Atomic Energy Authority Proton Accelerator Facility)

Session Classification: Poster Session

Contribution ID: **46** Type: **not specified**

Bateau Mouche Tour

Wednesday 17 September 2014 20:00 (2h 30m)

Bateaux Mouches are open excursion boats that provide visitors to Paris, France, with a view of the city from along the river Seine.

Registration for the Bateau Mouche tour will be available on 15 September 10:00-11:00 during the technical meeting “Registration”session.

Contribution ID: **47** Type: **Contributed**

Nuclear Science and Applications with Next Generation of High Power Lasers and Brilliant Low Energy Gamma Beams at ELI-NP

Monday 15 September 2014 16:25 (20 minutes)

The development of high power lasers and the combination of such novel devices with accelerator technology has enlarged the science reach of many research fields, in particular High energy, Nuclear and Astrophysics as well as societal applications in Material Science, Nuclear Energy and Medicine.
The European Strategic Forum for Research Infrastructures (ESFRI) has selected a proposal based on these new premises called "ELI"for Extreme Light Infrastructure. ELI will be built as a network of three complementary pillars at the frontier of laser technologies. The ELI-NP pillar (NP for Nuclear Physics) is under construction near Bucharest (Romania) and will develop a scientific program using two 10 PW class lasers and a Back Compton Scattering High Brilliance and Intense Low Energy Gamma Beam (0.5 to 19 MeV) produced by High Energy (720 MeV) electron linear C-Band accelerator, a marriage of Laser and Accelerator technology at the frontier of knowledge. In the present paper, the technical description of the facility, the present status of the project as well as the science, applications and future perspectives will be discussed.

Presenter: GALES, Sydney ("Horia Hulubei"National Institute for Physics and Nuclear Engineering)

Session Classification: Opening Session

Contribution ID: **48** Type: **not specified**

Presentation by PIGES

Wednesday 17 September 2014 15:00 (20 minutes)

Presenter: LANCELOT, Jean-Luc

Session Classification: Special Session of Industrial Partners