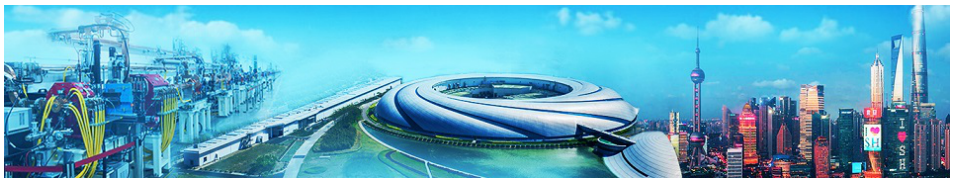
International Workshop on Breakdown Science and High Gradient Technology (HG2018)



Report of Contributions

https://indico.cern.ch/e/675785

Contribution ID: **22** Type: **not specified**

High Gradient S-band Electron Linac for ThomX

Wednesday, 6 June 2018 12:15 (25 minutes)

ThomX is a Compton source project in the range of the hard X rays (40/90 keV). The machine is composed of a 50/70 MeV injector Linac and a storage ring where an electron bunch collides with a laser pulse accumulated in a Fabry-Perot resonator. The final goal is to provide an X-rays average flux of 1011-1013 ph/s. Different users are partners in the ThomX project, especially in the area of medical science and cultural heritage. A demonstrator was funded and is being built on the Orsay university campus. During the commissioning phase, a standard S-band accelerating section is able to achieve around 50 MeV corresponding to around 45 keV X-rays energy. Since the maximum targeted X-ray energy is 90 keV, the Linac section design will provide an electron beam energy of 70 MeV. This requires essentially the development of more reliable high gradient compact S band accelerating section. We present here the design of high gradient compact S-band accelerating section for the upgrade program of the THOMX LINAC.

Primary author: Dr EL KHALDI , MOHAMED (LAL/CNRS)

Presenter: Dr EL KHALDI , MOHAMED (LAL/CNRS)

Session Classification: Project

Contribution ID: **23** Type: **not specified**

High-power gyro-klystrons for acceleration applications

Friday, 8 June 2018 10:15 (25 minutes)

High-power microwave sources play an important role in the applications of the radar system, controlled fusion plasma experiments, as well as particle accelerators. Currently, the conventional klystrons operating at S-, and X-band are the main driver in high-gradient accelerators. Klystrons with MW output power have been developed at CPI, SLAC, Thales, and so on. The most powerful klystron product is able to deliver higher than 50 MW at 11.424 GHz with us pulse length.
The future accelerators require higher acceleration gradient. One of the solutions is to operate the accelerating structures at a higher frequency. However, for conventional klystrons, operating at a higher frequency will significantly reduce the output power, with a factor of 1/f2. Gyro-klystrons not only have the bunching in the axial direction, which is the same as the klystrons. But also bunching at azimuthal direction due to the cyclotron resonance maser instability. It has the advantages of higher power capability as well as operating at higher frequency.
MW gyro-klystrons operating at Ka-and V-band for acceleration applications are currently being developed. It is a joint project between the University of Strathclyde, UK and University of Electronic Science and Technology of China (UESTC), China.
Two gyro-klystrons will be developed at the first stage. One is operating at 36 GHz for beam acceleration. From the simulation, a max output power of 1.9 MW, efficiency of 44%, gain of 39 dB and 3 dB bandwidth of 700 MHz were obtained. The other one is designed for the Compact Linear Accelerator for Research and Applications (CLARA), a Free-Electron Laser Test Facility at Daresbury Laboratory, UK. It will be used to drive the linearizer to correct the longitudinal phase space non-linearity from the RF acceleration. The operating frequency will be 48 GHz, which is 4th harmonic of the X-band linearizer. The output power of the gyro-klystron is predicted to be 1 MW if it is driven by a 100 kV, 50 A electron beam.
The long-term goal is to develop gyro-klystron at similar operating frequencies but with higher output power to 20 MW.

Primary authors: Dr ZHANG, Liang ((1)Department of Physics, SUPA, University of Strathclyde; (2)The Cockcroft Institute, Sci-Tech Daresbury, UK.); Dr WANG, Li (University of Electronic Science and Technology of China); Mr NIX, Laurence (Department of Physics, SUPA, University of Strathclyde); Dr DONG, Kun (The School for Electronic Science and Engineering, University of Electronic Science and Technology of China); Dr HE, Wenlong (Department of Physics, SUPA, University of Strathclyde); Prof. CROSS, Adrian ((1) Department of Physics, SUPA, University of Strathclyde; (2) The Cockcroft Institute, Sci-Tech Daresbury); Dr RONALD, Kevin ((1)Department of Physics, SUPA, University of Strathclyde; (2) The Cockcroft Institute, Sci-Tech Daresbury); Prof. PHELPS, Alan (Department of Physics, SUPA, University of Strathclyde)

Presenter: Dr ZHANG, Liang ((1)Department of Physics, SUPA, University of Strathclyde; (2)The Cockcroft Institute, Sci-Tech Daresbury, UK.)

Session Classification: Klystron and Power source

Contribution ID: **24** Type: **not specified**

Linking breakdown nucleation to critical plastic activity in electrode

Thursday, 7 June 2018 09:00 (25 minutes)

It has long been assumed that breakdown (BD) in vacuum cavities is initiated by field emission from localized surface irregularities causing localized field enhancement. However, the nature of these localized field enhancement region is unknown as of today, and remains as a missing part on the microscopic description of the BD process. This limits the ability to predict breakdown properties of materials as well as engineer materials which can withstand higher gradient as well as create improved conditioning methods.
The presentation covers recent experimental and theoretical efforts to establish the possibility that breakdown nucleation happens through a critical transition in the dislocation population driven by stresses as a result of the applied field. A stochastic mean field model was developed based on dislocation multiplication due to stresses generated below the exposed surface. Field and temperature dependencies of breakdown rates measured in SLAC and CERN using accelerating structures were used to calibrate and then validate the model. Microscopy work, including SEM and TEM on post mortem samples taken from accelerating structures demonstrate that while breakdown is a violent event involving melting and splashing of the electrode surface, we can identify pre-breakdown sub surface evolution which we propose is related to the described mechanism and may lead to subsequent conditioning. Finally, I will discuss prospects for advancement in mechanism identification using dedicated experiments, some of which are currently underway.

[1] E.Z. Engelberg, Y. Ashkenazy, M. Assaf, Phys. Rev. Lett. 120 (2018) 124801, https://link.aps.org/doi/10.1103/PhysRevLett.

Primary authors: ENGELBERG, Eli (Hebrew University of Jerusalem); ASHKENAZY, Yinon (The Hebrew University of Jerusalem (IL)); POPOV, Inna (T); Mrs YASHAR, Ayelet (Hebrew University of Jerusalem); LACHMANN, Sagy (Hebrew University of Jerusalem); NACHSHON, Itay; Dr ASSAF, Michael (Hebrew University of Jerusalem)

Presenter: ASHKENAZY, Yinon (The Hebrew University of Jerusalem (IL))

Session Classification: Breakdown and Experiments

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

Development of automated RF conditioning on CLARA

Tuesday, 5 June 2018 14:25 (25 minutes)

The new 400 Hz 120 MV/m photoinjector for CLARA will soon be conditioned. An automated RF conditioning program has been developed to perform the conditioning repeatably and with the minimum possible damage to the cavity. The program has been tested when re-conditioning on the current photoinjector, as well as on the first travelling wave linac. Conditioning method;differences for travelling and standing wave structures; difficulties and interesting phenomena are all discussed.

Primary author: COWIE, Louise (Science and Technology Facilities Council)

Co-authors: Dr SCOTT, Duncan (STFC Daresbury Laboratory); BURT, Graeme (Lancaster University (GB)); Mr MILLAR, Lee (Lancaster University (GB))

Presenter: COWIE, Louise (Science and Technology Facilities Council)

Session Classification: High gradient technology

Contribution ID: **26** Type: **not specified**

High efficiency power source development

Friday, 8 June 2018 09:00 (25 minutes)

A number of Toshiba's Klystrons E37113 with output RF power of 6MW and 44% efficiency are currently in operation in X-box3 at CERN. To increase the efficiency, thus RF power production of existing tube, whilst preserving perveance and modulator itself, the new design of the HE klystron has been done at CERN. This design is based on the COM bunching technology. However, due to the high beam perveance and relatively large beam aperture in existing tube, it appeared to be rather difficult to extract the RF power efficiently, even the bunch quality was considerably improved by the COM method. Coupled cell structures were adopted for the output cavity design to enhance the power extraction efficiency and to preserve reasonable (<80kV/m) level of the maximum surface electric field. The coupled cavities theory was implemented into the CERN's klystron code KlyC to facilitate fast and efficient optimisation of such klystrons. Latest results show that new design of X-band klystron provides efficiency above 60%, that will correspond to 8.3 MW output power expected. This design was verified using CST/3D PIC simulation and the reach of efficiency at a level 60% was confirmed. The design and simulation results of the new 8 MW X-band HE tube are presented.

Primary authors: CAI, Jinchi (CERN); SYRATCHEV, Igor (CERN)

Presenter: CAI, Jinchi (CERN)

Session Classification: Klystron and Power source

Contribution ID: **27** Type: **not specified**

Update on the AWA facility and Experimental Results

Tuesday, 5 June 2018 10:15 (25 minutes)

The Argonne Wakefield Accelerator (AWA) facility is transforming into a dual function facility which is continuously working on its main mission of developing the dielectric structure based short pulse Two Beam Acceleration (TBA) technology while providing the full access of flexible multiple beamlines to users. In this talk, we report on the recent dielectric TBA experiments and the new dielectric structure development. We also highlight recent users' experiments.

Primary author: JING, Chunguang (Euclid Techlabs LLC/Argonne National Laboratory)

Presenter: JING, Chunguang (Euclid Techlabs LLC/Argonne National Laboratory)

Session Classification: Facility Updating

Contribution ID: **28** Type: **not specified**

The Argonne Cathode Test-Stand (ACT) and Its first experiment

Thursday, 7 June 2018 09:50 (25 minutes)

The Argonne Cathode Test-stand (ACT) is a unique testbed to develop cathodes and to conduct fundamental surface study under ultra-high rf field (up to 700 MV/m with pin-shaped cathodes). The test-stand consists of an L-band 1.3 GHz single-cell photocathode rf gun and a field emission (FE) imaging system to locate emitters with a resolution of ~20 um. In the recent upgrade, UV laser has been introduced to improve the imaging system and to significantly expand the ACT towards photoemission and laser-assisted field emission research. In addition, a load-lock system has been added to the beam line to expedite the cathode switching period. We will present details of the ACT beamline as well as the first commission experiment.

Primary author: JING, Chunguang (Euclid Techlabs LLC/Argonne National Laboratory)

Presenter: JING, Chunguang (Euclid Techlabs LLC/Argonne National Laboratory)

Session Classification: Breakdown and Experiments

Contribution ID: **29** Type: **not specified**

High Efficiency, High Power, Lower Voltage MBK BAC-TCC Technology Covering X/C/S-Band

Wednesday, 6 June 2018 18:05 (25 minutes)

Future colliders (FCC, ESS, CLIC) and high energy accelerators for scientific, industrial and medical applications require high power, high efficiency sources in wide range of frequencies. Novel bunching technology (BAC) together with transverse coupled cavities technology (TCC) allow to achieve efficiency up to 80% and peak output powers till 10 MW in X/C/S bands with long lifetime and low voltage. The bases of BAC method and TCC technology, types of VDBT MBKs in the range of frequencies 1-12 GHz and modulators for them are examined in details with new design/development in range of 3.5MW RF Peak Power X/C/S MBK's . RF high power systems with the large number of MBKs are considered. Advantages of MBKs in comparison with magnetrons are given.

Primary authors: Mr LUNDBERG, Daniel (NELSON Created AB); GUZILOV, Igor

Presenter: Mr LUNDBERG, Daniel (NELSON Created AB)

Session Classification: Technology

Contribution ID: **30** Type: **not specified**

Development of Tsinghua X-Band High Power Test Facility

Tuesday, 5 June 2018 11:25 (25 minutes)

An X-band high power test facility at a frequency of 11.424 GHz is under constructing in Tsinghua University. The system consists of a CPI klystron with maximum output power up to 50 MW and a ScandiNova solid-state pulse modulator which provides the pulsed high voltage with the maximum flat top of 1.5 μs. Ion pumps keep super high vacuum of the inside of the klystron and the high power waveguides. RF breakdown interlock system has installed to protect the RF window on the klystron and the RF system. A pulse compressor is under development and it is expected to boost the power up to about 250 MW at 200ns pulse width. Recent commissioning results and plans for testing high-gradient structures will be presented.

Primary author: PENG, Maomao (Tsinghua University)

Presenter: PENG, Maomao (Tsinghua University)

Session Classification: Facility Updating

Contribution ID: **31** Type: **not specified**

PolariX TDS Applications at DESY

Tuesday, 5 June 2018 17:40 (25 minutes)

A collaboration between DESY, PSI and CERN has been established to develop and build a high-gradient polarizable X-band transverse deflecting structure (PolariX TDS) [1] which offers the possibility to streak in different directions. This PolariX TDS will be included in the DESY beamlines FLASH2, FLASHForward, and SINBAD and offers a variety of applications which will be presented in this talk.
At the free-electron laser (FEL) user facility FLASH2, it is planned to install two PolariX TDS downstream of the FLASH2 undulators. In combination with a dipole magnet this will enable the observation of the longitudinal phase space density of the electron bunches and the reconstruction of the X-ray temporal intensity profile [2].
At the plasma-wakefield acceleration experiment FLASHForward, it is intended to use one PolariX TDS downstream of the plasma cell. Beams driving as well as beams being driven by a plasma wakefield will be characterized and their capabilities to drive an FEL will be assessed [3].
The Accelerator Research Experiment at SINBAD (ARES) is dedicated to accelerator research and development, most notably plasma wakefield acceleration and dielectric accelerating structures. The ARES linac, where electron bunches with low charge (sub-pC) will be accelerated, will include two PolariX TDS to measure the bunch length, characterize the longitudinal phase space [4], and reconstruct the 3D charge distribution [5].
This presentation will give an overview of the different applications of the PolariX TDS at DESY.

[1] P. Craievich et al., Status of the X-Band TDS Project, in Proceedings of IPAC18, Vancouver, BC, Canada, paper THPAL068, 2018
[2] F. Christie et al., Generation of Ultra-Short Electron Bunches and FEL Pulses and Characterization of Their Longitudinal Properties at FLASH2, in Proceedings of IPAC17, Kopenhagen, Denmark, paper WEPAB017, 2017
[3] R. D'Arcy et al., Longitudinal Phase Space Reconstruction at FLASHForward Using a Novel X-band Transverse Deflection Cavity (XTDC), in Proceedings of IPAC18, Vancouver, BC, Canada, paper TUPML017, 2018
[4] D. Marx, et al., Longitudinal phase space reconstruction simulation studies using a novel X-band transverse deflecting structure at the SINBAD facility at DESY, Nuclear Inst. and Methods in Physics Research, A, 2018
[5] D. Marx et al., Reconstruction of the 3D Charge Distribution of an Electron Bunch Using a Novel Variable-Polarization Transverse Deflecting Structure (TDS), in Proceedings of IPAC17, Kopenhagen, Denmark, paper MOPAB045, 2017

Primary authors: CHRISTIE, Florian (DESY); VOGT, Mathias (DESY); SCHREIBER, Siegfried (DESY); Dr RÖNSCH-SCHULENBURG, Juliane (DESY); ASSMANN, Ralph Wolfgang (DESY); Mr MARX, Daniel (DESY); DORDA, Ulrich (DESY); MARCHETTI, Barbara; Dr D'ARCY, Richard (DESY); Mr GONZALEZ CAMINAL, Pau (DESY); OSTERHOFF, Jens (DESY); Dr HÜNING, Markus (DESY)

Presenter: CHRISTIE, Florian (DESY)

Session Classification: Application

Contribution ID: **32** Type: **not specified**

MICROWAVE BASED EXPERIMENT FOR MEASURING FIELD EMISSION, MULTIPACTOR AND BREAKDOWN CURRENTS

Tuesday, 5 June 2018 15:15 (25 minutes)

In order to further investigate field emission and vacuum arcs which limit the performance of the high gradient accelerating structures. New ways of measuring the properties of the plasma formed due to these processes are being developed. A novel experiment based on a microwave probe is discussed. The HOM damping waveguides of a TD24 CLIC structure are used to insert a low power RF signal, using a transmission band centered around the 17.7 GHz dipole mode. Analyzing this transmission while the high power RF is present in the structure we can see how the plasma formed due to field emission, Multipactor and RF breakdown affects to transmission amplitude and phase, this perturbation can be correlated with the density of electrons, by means of the plasma theory.

Primary author: Mr BANON CABALLERO, David (CERN - University of Valencia (ES))

Co-authors: WUENSCH, Walter (CERN); GIMENO, Benito (University of Valencia); FAUS-GOLFE, Angeles (Laboartoire de l'Accelerateur Lineaire)

Presenter: Mr BANON CABALLERO, David (CERN - University of Valencia (ES))

Session Classification: High gradient technology

Contribution ID: **33** Type: **not specified**

R&D Studies on the S-band Hybrid Bunching-accelerating Structure

Wednesday, 6 June 2018 17:15 (25 minutes)

Generally, a standard bunching system is composed of a SW pre-buncher, a TW buncher and a standard accelerating structure. In the industrial area, the bunching system is usually simplified by eliminating the PB and integrating the B and the standard structure together to form a β-varied structure. The beam capturing efficiency for this kind of simplified system is often worse than that for the standard one. The HB has been proved to be a successful attempt to reduce the cost but preserve the beam quality as much as possible. Here we propose to exclusively simplify the standard bunching system by integrating the PB, the B and the standard structure together to form a HBaS. Compared to the standard bunching system, the one based on the HBaS is more compact, and the cost is lowered to the largest extent. With almost the same beam transportation efficiency (~70%), the peak-to-peak (p-to-p) beam energy spread and the 1σ emittance of the linac with the HBaS are ~20% and ~60% bigger than those of the linac based on the split system. Based on the beam dynamics study results, a prototype of the HBas is being developed at IHEP, here the progress will also presented.

Primary author: Dr PEI, Shilun (IHEP)

Presenter: Dr PEI, Shilun (IHEP)

Session Classification: Technology

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

High Power RF Source Activities at IHEP

Wednesday, 6 June 2018 17:40 (25 minutes)

The high power RF sources system includes high power klystron, modulator, PSM power suppler, and solid state amplifier. There are 2856MHz klystron and modulators at BEPCII Linac, 1.3GHz klystron and max modulator on test platform for superconducting cavities system, 325MW CW klystron and PSM power supply for ADS RFQ system and 325MW solid state amplifiers for ADS SRF system. The 650MHz 150kW solid state amplifier is also successful development for ADS main accelerator. The design progress on CEPC high efficiency klystron is also showed in this paper. This paper describes activities of RF power system and its related technology development at IHEP.

Primary author: Dr ZHOU, Zusheng (IHEP)

Presenter: Dr ZHOU, Zusheng (IHEP)

Session Classification: Technology

Contribution ID: **35** Type: **not specified**

Simulation studies on the dielectric-loaded accelerating structures

Thursday, 7 June 2018 12:15 (25 minutes)

A potential alternative to conventional disk-loaded copper structures is dielectric-loaded accelerating (DLA) structures, which comprises a simple geometry where a dielectric tube is surrounded by a conducting cylinder. The simplicity of the DLA structure offers a great advantage for RF-driven (> X-band) accelerating structures as compared with conventional metal structures which demand extremely tight fabrication tolerances. The detailed geometry optimizations for DLA structures are presented in this talk. Different commercial software CST and HFSS are used to calculate the RF parameters for both DLA structures and Iris-loaded CLIC accelerating structures and relevant results are shown in comparison. In addition, the wakefield studies on DLA structures are also included in this talk.

Primary authors: Dr WEI, Yelong (CERN); Dr ALEXEJ, Grudiev (CERN)

Presenter: Dr WEI, Yelong (CERN)

Session Classification: RF Design

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

Power source development activities

Friday, 8 June 2018 09:50 (25 minutes)

An overview of potential consolidation and upgrades of the Xband test facilities at CERN and with collaborators, to increase the testing capability, reliability and expertise on high gradient structures.

Primary author: MCMONAGLE, Gerard (CERN)

Presenter: MCMONAGLE, Gerard (CERN)

Session Classification: Klystron and Power source

Contribution ID: **37** Type: **not specified**

High-gradient structures for medical applications

Tuesday, 5 June 2018 16:25 (25 minutes)

A number of initiatives to use linacs for proton therapy are underway and high-gradient technology may play an important role in making such linacs competitive with existing ring-based facilities. Collaborations between CLIC and both the Cockcroft Institute and the TERA foundation have designed high-gradient RF cavities for applications in hadron therapy. CLIC have established a field limiting quantity used in RF design of cavities, which is used alongside optimised manufacturing procedures to achieve the optimum high-gradient operation. The techniques have been applied to both the 'ProBE' 3 GHz side-coupled cavity and the 'KT' 3 GHz backwards travelling wave structure (bTWS) both presented in this talk. The bTWS has been high power tested in the 'S-Box' high-gradient test facility in CTF2 since 2016 and preliminary results are presented alongside future plans to test the ProBE cavity.

Primary authors: Ms PITMAN, Samantha Louise (CERN); BENEDETTI, Stefano (CERN); VNUCHENKO, Anna (Univ. of Valencia and CSIC (ES)); GRUDIEV, Alexej (CERN); WUENSCH, Walter (CERN); CATALAN LASHERAS, Nuria (CERN); MCMONAGLE, Gerard (CERN)

Presenter: Ms PITMAN, Samantha Louise (CERN)

Session Classification: Application

Contribution ID: **38** Type: **not specified**

XBOX Operation and performance

Tuesday, 5 June 2018 11:50 (25 minutes)

There are 3 X-band test stands at CERN dedicated to the high gradient testing of prototype accelerating structures and RF components. This speech will cover the operational challenges, the upgrades in the algorithms for conditioning and the status of the stands during the last year.

Primary author: DEL POZO ROMANO, Veronica (CERN)

Presenter: DEL POZO ROMANO, Veronica (CERN)

Session Classification: Facility Updating

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

High-Gradient Technology at PSI and Ongoing R&D Cooperations

Tuesday, 5 June 2018 14:00 (25 minutes)

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Primary author: Dr RAGUIN, Jean-Yves

Presenter: Dr RAGUIN, Jean-Yves

Session Classification: High gradient technology

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

Update on the LIGHT prototype development

Wednesday, 6 June 2018 10:15 (25 minutes)

The company ADAM (Application of Detectors and Accelerators to Medicine), a CERN spin-off, is working on the construction and testing of its first linear accelerator for medical application: LIGHT (Linac for Image-Guided Hadron Therapy). LIGHT is an innovative high frequency proton linac designed to accelerate proton beams up to 230 MeV for protontherapy applications. A prototype of LIGHT is presently under commissioning at CERN. This paper gives an update of the different stages of installation and commissioning of the LIGHT prototype including beam tests results obtained during the past year at different energies.

Primary author: Dr DEGIOVANNI, Alberto (ADAM)

Presenter: Dr DEGIOVANNI, Alberto (ADAM)

Session Classification: Project

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

Theoretical understanding of mechanisms triggering vacuum breakdown

Thursday, 7 June 2018 09:25 (25 minutes)

Application of electric fields on metal surfaces may be beneficial and detrimental. In our research, we are looking for the changes on the surface, which may lead to vacuum arcing, known to those who are dealing with the high/voltage electronics as electrical breakdowns. These cause problems in many appliances operating in high electric field, such as the Compact Linear Collider (CLIC), a proposed next-generation particle accelerator in CERN. The breakdown phenomenon is not well understood despite decades of research devoted to investigation of this phenomenon.
What triggers the surface to break when high electric fields are applied is the focus of the research in our group. Currently we are working on an atom-level theoretical model of surface behavior under high electric fields. The model covers many stages of plasma development and includes different physical processes evolving on different time scales. Our model aims to explain the physical limitation of a metal surface due to electrical breakdowns at the fields well below the critical values known to cause field evaporation of atoms. The core of the model is the atomistic simulations of metal surface features under high electric field, which will be presented during the workshop along with the obtained results.

Primary authors: Dr DJURABEKOVA, Flyura; Dr KYRITSAKIS, Andreas (University of Helsinki); Dr JANSSON, Ville (University of Helsinki); Mr VESKE, Mihkel (University of Helsinki); Ms BAIBUZ, Ekaterina (University of Helsinki)

Presenter: Dr DJURABEKOVA, Flyura

Session Classification: Breakdown and Experiments

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

Update on high-power testing of X-band RF structures at CERN

Tuesday, 5 June 2018 14:50 (25 minutes)

At the high-gradient X-band test facility at CERN, prototype accelerating structures for the Compact Linear Collider (CLIC) are tested at high powers of up to 50 MW to achieve accelerating gradients of over 100 MV/m and peak surface electric fields of over 220 MV/m, and are conditioned to reach the highest possible gradient at low breakdown rate. The setup of the test stands will be presented, as well as recent structure results including conditioning histories, breakdown localisation, field emission in the form of Faraday cup signals and radiation, as well as comparisons between different structure designs and conditioning strategies.

Primary author: Mr PASZKIEWICZ, Jan (University of Oxford (GB))

Presenter: Mr PASZKIEWICZ, Jan (University of Oxford (GB))

Session Classification: High gradient technology

Contribution ID: **43** Type: **not specified**

Dark current fluctuation measurements in RF structures

Thursday, 7 June 2018 10:15 (25 minutes)

The dynamics of dislocation activity under intense electric fields has been proposed as a potential cause of breakdowns. In this talk, results of searches for high-frequency fluctuations in field-emitted current that could arise as a consequence of these dynamics are presented for high-gradient RF accelerating structures at CERN. Measurements of spatial profiles of field emission in RF structures and long-term variations are also discussed.

Primary author: Mr PASZKIEWICZ, Jan (University of Oxford (GB))

Presenter: Mr PASZKIEWICZ, Jan (University of Oxford (GB))

Session Classification: Breakdown and Experiments

Contribution ID: **44** Type: **not specified**

Progress of x-band high power test platform at SINAP

Tuesday, 5 June 2018 11:00 (25 minutes)

The X-band high power test platform at SINAP have been proposed several years, now the key equipment such as klystron will delivered to Jiading campus soon, and then the installment will start.
The high power test platform has great help for development of x-band high gradient technology at SINAP. Lots of RF activities on x-band have begun in recent years, and some results will introduced in this presentation.

Primary authors: TAN, Jianhao (SINAP); FANG, Wencheng (Shanghai Institute of Applied Physics); GU, qiang (sinap); HUANG, Xiaoxia; LI, Zongbin (Shanghai Inst. of Applied Physics Chinese Academy of Science (); ZHAO, Zhentang

Presenter: TAN, Jianhao (SINAP)

Session Classification: Facility Updating

Contribution ID: **45** Type: **not specified**

New directions in structure and component fabrication

Wednesday, 6 June 2018 16:50 (25 minutes)

This talk will describe the new developments in the structure and components for X-band technologies at CERN. The main issues covered in the talk will be the progress in the manufacturing of the structures made in halves as well as in structures made of rectangular discs. The talk will also include a brief update of possible future designs of other X-band components such as couplers.

Primary author: SZYPULA, Kamil Tomasz (CERN)

Presenter: SZYPULA, Kamil Tomasz (CERN)

Session Classification: Technology

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

Research on wakefield suppression of two bunch operation mode in X-band disk-loaded accelerating structure

Thursday, 7 June 2018 11:00 (25 minutes)

FEL R&D is being promoted dramatically as a light source technology and gradually develop into compact facility. FEL facility is usually operated with single bunch and has a high beam quality. In order to increase the average current intensity further, two bunch operation mode or multi-bunch operation mode is proposed to be applied to FEL facilities. Wakefield effect of multi-bunch operation mode is a factor resulting in beam instability, so research should be forced on wakefield principle and suppression. The waveguide damped structure is satisfied with the requirements, but it is more complex than disk-loaded structure. In this report, we study the wakefield suppression in disk-loaded structure and obtain preliminary wakefield effect results based on Gaussian detuning principle in disk-loaded structure to verify the realization of two bunch operation mode and several bunches operation mode.

Primary author: HUANG, Xiaoxia (SINAP)

Presenter: HUANG, Xiaoxia (SINAP)

Session Classification: RF Design

Contribution ID: **47** Type: **not specified**

Optimization of Pulse modulator for SXFEL

Friday, 8 June 2018 11:00 (25 minutes)

In this oral report, the design of pulse modulator at SINAP is presented. The stability of RF system is one of the major factors to get great beam performance. It is mainly determined by a low level RF driving system and klystron modulators. The beam voltage of klystron, which is the pulsed voltage of pulse modulator, is directly affecting the amplitude and phase of klystron output RF waveform. This oral report summaries the methods used for improve the performance of modulator at SINAP. These methods mainly includes upgrading of CCPS, trigger system, heater power supply and reducing EMI leakage. To achieve better performance, we design an oil filled modulator which is used for 50MW X-band klystron. An introduction about this modulator design is given at last.

Primary author: LIU, Yongfang (SINAP)

Presenter: LIU, Yongfang (SINAP)

Session Classification: Klystron and Power source

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

Status of the X-band 50MW klystron at BVERI

Friday, 8 June 2018 09:25 (25 minutes)

In the past 3 years, an experiment diode tube and 2 prototype tubes were manufactured at BVERI. The beam voltage of the diode tube achieves 454kV and the perveance is 0.67 μP. The first prototype is being tested, and the second is prepared to change the electron gun because sometimes its filament is partly short. With the testing of the first prototype, its frequency is mistuned from 11.402GHz to 11.384GHz due to low transmission—96%. while the peak output power achieves 36MW with 420kV beam voltage at 11.384GHz.

Primary author: CHU, Kairong (BVERI)

Presenter: CHU, Kairong (BVERI)

Session Classification: Klystron and Power source

Contribution ID: **49** Type: **not specified**

A High Gradient Solution for Increasing the Energy of the FERMI Linac

Wednesday, 6 June 2018 11:50 (25 minutes)

FERMI is the seeded Free Electron Laser (FEL) user facility at Elettra laboratory in Trieste, operating in the VUV to soft X-rays spectral range. In order to extend the FEL spectral range to shorter wavelengths, a feasibility study for increasing the Linac energy from 1.5 GeV to 1.8 GeV is actually ongoing. The design of new S-band accelerating structures, tailored for high gradient operation, low breakdown rates and low wakefield contribution, is presented. First test results of a short prototype built in collaboration with Paul Scherrer Institut (PSI) will also be reported.

Primary author: SERPICO, Claudio (Elettra Sincrotrone Trieste)

Presenter: SERPICO, Claudio (Elettra Sincrotrone Trieste)

Session Classification: Project

Contribution ID: **50** Type: **not specified**

Design of high gradient LINAC with the new Gasket-Clamping technique and compact low pulsed heating couplers

Thursday, 7 June 2018 11:50 (25 minutes)

Recently, a new technique for the realization of high gradient accelerating structures, based on the use of special gaskets has been implemented for the realization of the new SPARC_LAB and ELI-NP RF guns.
They have been successfully tested at high power leading to new perspectives in the realization of high gradient structures. The new technique has been developed at the Laboratories of Frascati of the INFN
(Italy) and make use of special gaskets that simultaneously guarantee vacuum seal and perfect RF contact. The implementation of the gaskets allow avoiding the brazing process, strongly reducing the cost, the realization time and the risk of failure. Moreover, without copper annealing due to the brazing process, it is possible to decrease the breakdown rate increasing the maximum achievable gradient.
The next step is the application of this technique to the fabrication of complex S, C or X- band LINAC structures. In the paper, after a short introduction on the experimental results obtained with the RF guns we illustrate in detail the electromagnetic and mechanical design of a high gradient S-band Linac structure now under fabrication.
In the last part of the talk we will also address at new compact low pulsed heating geometries recently developed for clamped and brazed structures.

Primary author: CARDELLI, Fabio (INFN-LNF Frascati)

Presenter: CARDELLI, Fabio (INFN-LNF Frascati)

Session Classification: RF Design

Contribution ID: **51** Type: **not specified**

Status of high gradient X band LINAC design for the EUPRAXIA@SPARC_LAB project and XLS accelerating structures design

Wednesday, 6 June 2018 09:25 (25 minutes)

The linac of the EuPRAXIA@SPARC_LAB project is based on an S-band Gun, three S-band TW structures and an X-band booster with a bunch compressor. The X-band technology allows reaching a high accelerating gradient and a high facility compactness, which are some of the goals of the projects. The accelerating structures are TW cavities fed by klystrons and pulse compressor systems. In the presentation, after a short introduction to the project, we illustrate the RF design of the X-band linac with a discussion on the preliminary layout of the accelerating module, open points and multi-bunch linac option. The same design criteria have been also adopted for the preliminary design of the accelerating structures of the recently approved "XLS Compact Light" design study. In the second part of the presentation we will address at these preliminary results.

Primary author: ALESINI, David (INFN-LNF Frascati)

Presenter: ALESINI, David (INFN-LNF Frascati)

Session Classification: Project

Contribution ID: **52** Type: **not specified**

R&D of Travelling Wave Accelerating structures at IHEP

Tuesday, 5 June 2018 16:50 (25 minutes)

In Recent years, travelling wave accelerating structures have been studied at IHEP. This report includes the study of R&D of S-band, C-band and X-band accelerating structures. The S-band structure is developed for the CEPC project. The accelerating gradient goal of this structure is 30MV/m at 1μs. The study of C-band structure is supported by Research and Development Funds of IHEP. Also the X-band structure's study will be introduced which is supported by Key Laboratory funds of the Chinese Academy of Sciences. For X-band, open structure was chosen to study.

Primary author: ZHANG, Jingru (IHEP)

Presenter: ZHANG, Jingru (IHEP)

Session Classification: Application

Contribution ID: **53** Type: **not specified**

R&D of CEPC 650MHz/800kW klystron

Friday, 8 June 2018 11:25 (25 minutes)

In order to save manufacturing and operating cost for the RF power system of CEPC, the 650MHz/800kW high efficiency klystron has been regarded as a priority key technology to be researched and developed. In November 2017, a high efficiency klystron Cooperation group was established by IHEP combined with IECAS and GLVAC. So far the mechanical design of the first porotype klystron has been completed. The presentation will introduce the progress of 650MHz/800kW klystron.

Primary author: XIAO, Ouzheng (IHEP)

Presenter: XIAO, Ouzheng (IHEP)

Session Classification: Klystron and Power source

Contribution ID: **54** Type: **not specified**

The test of RF breakdowns of CPHS RFQ and RFQ RF parameters measurement

Wednesday, 6 June 2018 15:15 (25 minutes)

This report includes two sections. Section I focuses on RF breakdowns of Compact Pulsed Hadron Source□CPHS□RFQ. The conditioning history curve of CPHS RFQ has been recorded. After the post-processing of experiment data□the normalized curve of the conditioning history turned into a relatively smooth curve, which indicated that the empirical formula proposed by CERN for the high gradient electron accelerating structures maybe expand to RFQs with much lower frequency. Section II focuses on the RFQ RF parameters measurement. According to the reflected waveforms from the directional coupler and the signal from pickup recorded by an oscilloscope, the RFQ RF parameters (QL, f0, beta) can be measured in the high power condition.

Primary author: YE, Wenbo (Tsinghua University)

Presenter: YE, Wenbo (Tsinghua University)

Session Classification: High power test

Contribution ID: **55** Type: **not specified**

Development of compact RF pulse compressors and pulse modulation experiments

Wednesday, 6 June 2018 14:50 (25 minutes)

The Accelerator Laboratory of Tsinghua University has been carrying out research on radio frequency (RF) pulse compressors at both S-band and X-band. The S-band high-power test facility mainly consists of two S-band klystrons and a SLED-I type pulse compressor. Pulse modulations including the phase-to-amplitude modulation and high efficiency pulse compression have been demonstrated experimentally. As for the development of pulse compressors, we have successfully designed, fabricated and tested an S-band compact pulse compressor with a single spherical resonant cavity and an RF polarizer. The available RF peak power of 70 MW can be compressed to a peak power of more than 500 MW. An X-band pulse compressor using a high Q0 corrugated circular cavity and an RF polarizer has also been designed and microwave measured.

Primary author: JIANG, Yuliang (Tsinghua University)

Presenter: JIANG, Yuliang (Tsinghua University)

Session Classification: High power test

Contribution ID: **56** Type: **not specified**

High-gradient performance of X-band choke-mode damped accelerating structure

Wednesday, 6 June 2018 14:00 (25 minutes)

The choke-mode accelerating structure is one of the higher-order-mode (HOM) damping structures. It has the advantage of relatively simple fabrication and low surface magnetic field. The high-gradient performance of X-band choke-mode accelerating structures has been studied with six different single-cell prototypes. It was observed that high electric field and small choke dimension caused serious breakdowns in the choke which was the main limitation of the high-gradient performance. The choke-mode accelerating structures reached 130~MV/m by decreasing the electric field and increasing the choke gap. The absence of field emission current flash was proposed to be the sign of breakdowns occurring inside the choke, this was verified by the post-mortem observation. A new quantity was proposed to give the high-gradient performance limit of choke-mode accelerating structures due to RF breakdown.

Primary author: SHI, Jiaru (Tsinghua University)

Presenter: SHI, Jiaru (Tsinghua University)

Session Classification: High power test

Contribution ID: **57** Type: **not specified**

High-gradient X-band structures for Inverse Compton Source at Tsinghua University

Wednesday, 6 June 2018 11:25 (25 minutes)

Tsinghua Thomson-scattering X-ray facility (TTX) has been successfully operating at beam energy of 50MeV and delivering photons at 25keV for the users. X-band high-gradient accelerating structures are proposed for energy upgrade of the beamline and a future project of compact gamma-ray source to generate ~MeV photons. A constant impedance structure, namely "XC72", has been designed along with an SLED-I type pulse compressor for the application. This presentation will present the TTX projects and the structure optimization.

Primary author: ZHA, Hao (Tsinghua University)

Presenter: ZHA, Hao (Tsinghua University)

Session Classification: Project

Contribution ID: **58** Type: **not specified**

High-gradient and short-pulsed X/S-band Linacs and the application to Medicine, Industrial/Social Infrastructure Inspection and Fukushima Fuel Debris Analysis

Tuesday, 5 June 2018 16:00 (25 minutes)

Portable 950 keV / 3.95 MeV X-band (9.3GHz) electron linac X-ray sources has been successfully applied to medicine and industrial/social infrastructure inspection. After the serious accident of old-tunnel wall collapse 5 years ago, the Japanese government has forced the bridge holders to perform regular inspection by eyes and hammering once for every 5 years. However, our X-ray sources have found several cases where the inner reinforced steel wires were corrupted or thinned or cut even the near surface looked healthy. Not enough filling of grout to tubes of PC (Pre-stressed Concrete) bridges were also detected. The Japanese government is going to form a new technical guideline for safer maintenance using our X-ray sources. As for the industrial infrastructure inspection, we have visualized the dynamic images of the surfaces of liquid and fluid in a chemical reaction chamber and tube, and melted steel in a converter furnace. It can contribute to not only monitoring maintenance but also upgrade of production yields. 3.95 MeV X-band linac neutron source is going to be governmentally approved to be a radiation source after checking the possibility of moister inspection in bridge and short-length TOF (Time of Flight) measurement of neutron resonance absorption. We are verifying dual energy X-ray CT and neutron resonance absorption for on-site U/Pu quantitative evaluation for melted fuel debris in Fukushima.
35 MeV 25 kW S-band (2.856GHz) electron linac □-ray source and 99Mo/99mTc supply system is under detailed design. 10 and 100 systems may be able to meet the medical demands in Japan and world, respectively. We are joining the IAEA international collaborating benchmark task on medical RI production and use beyond fission and cyclotron. This type of linac can be used for a short-pulsed neutron source and a variety of new neutron applications at the Yayoi research reactor room of University of Tokyo after its decommission is completed in a couple of years. 35/18 MeV electron linac facility of University of Tokyo for open uses on radiation chemistry/physics has 40 years anniversary. As you see, “35”MeV is a magic number for S-band electron linac, which would be optimum for scientific uses and neutron/□-ray sources. There are such tens 35 MeV linacs in the world. If we can apply high gradient technologies, it can consist of one accelerating structure and one klystron with a RF pulse compressor. Hence, the high gradient technologies can contribute to their downsizing and renewal. This could be one of the important issues in our society.

Primary author: UESAKA, Mitsuru (Nuclear Professional School, University of Tokyo)

Presenter: UESAKA, Mitsuru (Nuclear Professional School, University of Tokyo)

Session Classification: Application

Contribution ID: **59** Type: **not specified**

High gradient activities at Nextef and around

Tuesday, 5 June 2018 09:25 (25 minutes)

We have been tested many CLIC prototype TW structures in Nextef-A.
We will review recent ones, TD24R05 and TD26CC-K1.
Also we have started the single-cell SW tests in Nextef-B.
We briefly discuss what we have done and what is being done.
In both test stands, we will discuss what we will chase in near future.

Primary author: HIGO, Toshiyasu (KEK)

Presenter: HIGO, Toshiyasu (KEK)

Session Classification: Facility Updating

Contribution ID: **60** Type: **not specified**

Commissioning of the V-box Laboratory at IFIC

Tuesday, 5 June 2018 12:15 (25 minutes)

An S-band High-Gradient (HG) Radio Frequency (RF) laboratory is under construction and commissioning at IFIC. The purpose of the laboratory is to perform investigations of high-gradient phenomena and to develop normal-conducting RF technology, with special focus on RF systems for hadron-therapy. The layout of the facility is derived from the scheme of the Xbox-3 test facility at CERN [1] and uses medium peak-power (7.5 MW) and high repetition rate (400 Hz) klystrons, whose RF output is combined to drive two testing slots to the required power. The design and construction of the various components of the system started in 2016 and has been completed. The installation and commissioning of the laboratory is progressing, with first results expected before mid-2018. The technical characteristics of the different elements of the system and the commissioning status together with preliminary results are described.

Primary author: ESPERANTE PEREIRA, Daniel (IFIC - University of Valencia, CSIC)

Presenter: ESPERANTE PEREIRA, Daniel (IFIC - University of Valencia, CSIC)

Session Classification: Facility Updating

Contribution ID: **61** Type: **not specified**

High-gradient system integration

Wednesday, 6 June 2018 16:00 (25 minutes)

The talk presents different aspects of the integration of high-gradient accelerating structures into modules that either exploit the classical CLIC two-beam acceleration scheme or that rely on klystron amplifiers to produce the beam acceleration.

Primary author: ROSSI, Carlo (CERN)

Presenter: ROSSI, Carlo (CERN)

Session Classification: Technology

Contribution ID: **62** Type: **not specified**

3.5 GeV X-band linac for primary electron beam facility at CERN

Wednesday, 6 June 2018 09:50 (25 minutes)

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Primary author: GRUDIEV, Alexej (CERN)

Presenter: GRUDIEV, Alexej (CERN)

Session Classification: Project

Contribution ID: **63** Type: **not specified**

Plans for constructing high-gradient S-band cavities using non-brazing method in Iran

Tuesday, 5 June 2018 17:15 (25 minutes)

Design and construction of S-band linear accelerator in Institute for research in fundamental science (IPM), is one of the successful experiences in design and construction of accelerators in Iran. Since brazing method has not been used for construction of such a system, copper remains hard during manufacturing process and hence this method would be a better candidate for construction of high gradient cavities. In addition, relatively low cost of such method will result in spread of high-gradient technology. Plans for this project consist of radiofrequency and mechanical design of cavities with Shrinking fit, Clamping and Vacuum Brazing method. After cold and hot test of cavities in Iran, high gradient test such as Breakdown Rate will be carried out in SBOX RF test stand at CERN.

Primary author: AGHAYAN, Seyedabdolmahdi (KN Toosi University of Technology)

Co-authors: SHAKER, hamed (Institute for research in fundamental science (IPM)); MASOUDI, farhad (K.N.TOOSI University of technology); GHASEMI, farshad (Institute for research in fundamental science (IPM))

Presenter: AGHAYAN, Seyedabdolmahdi (KN Toosi University of Technology)

Session Classification: Application

Contribution ID: **64** Type: **not specified**

The CLIC high-gradient fabrication and testing program

Tuesday, 5 June 2018 09:50 (25 minutes)

Much has been learned in the past decade regarding high gradient RF structures, in particular, thanks to the operation of the European X-band test facilities at CERN. The CLIC study needs to present to the European Strategy Group a case for a 380 GeV machine upgradable to higher energies and with a final aim of 3TeV centre of mass collisions. This case needs to address, design, manufacturability, commissioning and operation of the RF structures. This talk will present the main activity lines foreseen for the fabrication of CLIC prototypes for the next years as well as the testing program integrating both the CERN production as well as structures coming from external collaborations.

Primary author: CATALAN LASHERAS, Nuria (CERN)

Presenter: CATALAN LASHERAS, Nuria (CERN)

Session Classification: Facility Updating

Contribution ID: **65** Type: **not specified**

Status of the CompactLight project

Wednesday, 6 June 2018 09:00 (25 minutes)

CompactLight (XLS) is a three-years project, funded by EU in the context of the Horizon 2020 work Programme 2016-2017, Research Infrastructures, Design Studies. The project aims at designing the next generation of compact hard X-Rays FEL facilities, beyond today's state of the art, using the latest concepts for bright electron photo injectors, very high-gradient X-band structures, operating at 12 GHz, and innovative short-period undulators. The talk gives an overview and status of the project.

Primary author: D'AURIA, Gerardo (Elettra - Sincrotrone Trieste)

Presenter: D'AURIA, Gerardo (Elettra - Sincrotrone Trieste)

Session Classification: Project

Contribution ID: **66** Type: **not specified**

A new spherical pulse compressor working with degenerated ”Whispering Gallery” mode

Thursday, 7 June 2018 11:25 (25 minutes)

CLIC is focusing on the Compact Linear Collider. This work is to make an alternative design for CLIC pulse compression scheme. Using a spherical cavity, the new design can offer a higher Q factor compared with a cylindrical cavity. Besides, the use of degenerated “Whispering Gallery” mode makes the mode launcher much smaller.

Primary author: LI, Zongbin (SINAP)

Presenter: LI, Zongbin (SINAP)

Session Classification: RF Design

Contribution ID: **67** Type: **not specified**

High gradient RF activities of projects at SINAP

Wednesday, 6 June 2018 11:00 (25 minutes)

X-band and C-band high gradient technology, as crucial technology of projects, have been developed for several years. C-band high gradient RF structure reached 50.8MV/m by beam test, and finally has been used for main linac of SXFEL project. Based on mutual system, C-band RF system is extended for many other projects, such as UED and injector of light source. As advanced technique, X-band RF system is also under develop at SINAP, beginning with X-band linearizer in SXFEL, one X-band high power test setup will be built soon, many RF structures will also been ready soon for experiment of high power test, and it will carry out higher accelerating gradient for compact facility, in particular for compact FEL facility. This talk will introduce high gradient RF activities for projects at SINAP, including SXFEL, UED, SLRI and test setup.

Primary author: FANG, Wencheng (SINAP)

Presenter: FANG, Wencheng (SINAP)

Session Classification: Project

Contribution ID: **68** Type: **not specified**

LLRF layout and design for X-band test setup at SINAP

Wednesday, 6 June 2018 14:25 (25 minutes)

The High power test stand located in Jiading Campus at SINAP had finished conditioning two C band accelerate tube since 2018. We are also builindg our X band LLRF system, which will be put into use this year.
In this presentation, the LLRF system in the test stand will be introduced, which had fufilled the functions like breakdown data monitoring and analyzation, modulator communication and trigger allocation.

Primary author: XIAO, Chengcheng (SINAP)

Presenter: XIAO, Chengcheng (SINAP)

Session Classification: High power test

Contribution ID: **69** Type: **not specified**

Development and Processing of C-band accelerating structure fabrication for SXFEL

Wednesday, 6 June 2018 16:25 (25 minutes)

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Primary author: WANG, Hui (IHEP)

Presenter: WANG, Hui (IHEP)

Session Classification: Technology

Contribution ID: **70** Type: **not specified**

High Power Klystrons at CPI

Friday, 8 June 2018 11:50 (25 minutes)

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Primary author: KOLDA, Peter (Communications & Power Industries LLC)

Presenter: KOLDA, Peter (Communications & Power Industries LLC)

Session Classification: Klystron and Power source

Contribution ID: **74** Type: **not specified**

CompactLight WP4 meeting

Room 225

Session Classification: CompactLight WP4 meeting

Contribution ID: **75** Type: **not specified**

Welcome and Meeting notice

Tuesday, 5 June 2018 09:00 (25 minutes)

Welcome and Meeting notice

Presenter: Prof. ZHAO, Zhentang (SINAP)

Session Classification: Facility Updating

Contribution ID: **76** Type: **not specified**

Hang Ye Vacuum

Thursday, 7 June 2018 14:00 (20 minutes)

Presenter: HANG YE VACUUM

Session Classification: Industry exhibition and Poster

Contribution ID: **77** Type: **not specified**

NELSON Created AB

Thursday, 7 June 2018 15:20 (20 minutes)

Presenter: NELSON CREATED AB

Session Classification: Industry exhibition and Poster

Contribution ID: **78** Type: **not specified**

MITSUBISHI ELECTRIC CORPORATION

Thursday, 7 June 2018 14:40 (20 minutes)

Presenter: MITSUBISHI ELECTRIC CORPORATION

Session Classification: Industry exhibition and Poster

Contribution ID: **79** Type: **not specified**

Toshiba Electron Tubes & Device Co,Ltd

Thursday, 7 June 2018 15:00 (20 minutes)

Presenter: TOSHIBA ELECTRON TUBES & DEVICE CO,LTD

Session Classification: Industry exhibition and Poster

Contribution ID: **80** Type: **not specified**

Hebei Signal microwave Technology Co., ltd

Thursday, 7 June 2018 14:20 (20 minutes)

Presenter: HEBEI SIGNAL MICROWAVE TECHNOLOGY CO., LTD

Session Classification: Industry exhibition and Poster

Contribution ID: **82** Type: **not specified**

Closing Remark

Friday, 8 June 2018 12:40 (10 minutes)

Primary author: WUENSCH, Walter (CERN)

Co-author: Dr WENCHENG, Fang (SINAP)

Presenters: WUENSCH, Walter (CERN); Dr WENCHENG, Fang (SINAP)

Session Classification: Klystron and Power source

Contribution ID: **83** Type: **not specified**

RF Terminator: compact RF load from SiC

Friday, 8 June 2018 12:15 (25 minutes)

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Primary author: GRUDIEV, Alexej (CERN)

Presenter: GRUDIEV, Alexej (CERN)

Session Classification: Klystron and Power source