Vacuum Technology
Room 121 - Session VT4-TuM

Accelerators and Large Vacuum Systems

Moderators: Sol Omolayo, Lawrence Berkeley National Laboratory, **Jacob Ricker**, NIST

11:00am **VT4-TuM-13 Vacuum System for the High Magnetic Field Beamline at Cornell High Energy Synchrotron Sources***, **Yulin Li**,* Cornell University

After a very successful CHESS-U upgrade in 2019, a special new X-ray beamline is currently under development at CLASSE. The new beamline, the High Magnetic Field (HMF) beamline, enables users to study samples under up to 20-Tesla magnetic field, with 4X larger optic access, a factor of 10e4 in the photon flux at photon energy >20 keV. The design and fabrication of vacuum components for the HMF beamline is presented in this talk, including the storage ring modification, the front ends, and a very large end station vacuum system.

11:15am **VT4-TuM-14 Leveraging SLAC Facilities and Expertise to Optimize Vacuum Beamline for LCLS-II Accelerator***, **Giulia Lanza**,* SLAC National Accelerator Laboratory

The success of the Linac Coherent Light Source II (LCLS-II) accelerator critically hinges on the efficient operation of its vacuum beamline, demanding the presence of technical facilities and skilled personnel. This presentation showcases the resources available at SLAC National Accelerator Laboratory (SLAC) tailored to support the vacuum beamline of the LCLS-II accelerator.

The plating shop provides vital support for the cleanliness of components. The brazing and welding expertise at SLAC allows the construction and repair of vacuum beamline infrastructure, fostering resilience and longevity in the face of demanding operational conditions. Multiple bake stations facilitate processing of different components in parallel, ensuring optimal vacuum conditions. Moreover, SLAC's array of cleanrooms tailored to diverse particle-free requirements guarantees the integrity and purity of vacuum components, essential for maintaining operational efficiency and minimizing contamination risks. Rounding out SLAC's capabilities are systems specific for outgassing tests and residual gas analysis, providing the possibilities to test non-standard material and composites.

This presentation illuminates how the integration of SLAC's facilities and skilled workforce supports the vacuum beamline of the LCLS-II accelerator, underpinning its mission to push the boundaries of scientific exploration.

11:30am **VT4-TuM-15 Factors Affecting XHV Polarized Electron Source Lifetime***, **Marcy Stutzman**,* Jefferson Lab*; J. Yoskowitz,* Jefferson Lab, Los Alamos National Lab

The Jefferson Lab polarized electron source utilizes a combination of ion pumps, NEG pumps, and NEG coating to achieve pressures as low as 2x10^-12 Torr. Operational lifetime is primarily limited by residual gas in the system being ionized by the electron beam and accelerating into the photocathode, which is susceptible to ion implantation damage. Recent upgrades to the injector vacuum system include additional pumping in the first 15 meters downstream of the electron gun. Additionally, the anode in the gun has been biased to reduce ion impingement from gas ionized downstream of the anode. We will present a study of the effect of these upgrades, and our efforts to distinguish improvements due to the biased anode from those due to the improved beamline vacuum, including comparison of beamline vacuum modeling and ion implantation simulations.

11:45am **VT4-TuM-16 Vacuum Technology Developments at Daresbury Laboratory for Modern Accelerators***, **Keith J. Middleman**, C. Benjamin, J. Conlon, R. Luff, O. Malyshev, E. Marshall, O. Poynton, D. Seal, L. Smith, R. Valizadeh, S. Wilde,* STFC Daresbury Laboratory, UK

The Vacuum Solutions group at the STFC Daresbury Laboratory has a unique position in that it has the capability to operate and design the vacuum systems for new accelerators whilst maintaining a very active research laboratory looking at many new facets of vacuum design for accelerators.This gives the group the opportunity to develop ideas in the laboratory before implementing them on the accelerator.This paper will present some of the latest accelerator ideas and machines at Daresbury and provide an insight into how some of our laboratory developments are helping improve the vacuum design.

A range of topics will be covered such as:

1. Machine developments – CLARA, FEBE and the vacuum challenge of plasma-wakefield experiments
2. NEG coatings – our latest research
3. Thin films – SRF coating developments
4. Photocathode research – metal and semiconductor cathode developments
5. New cleaning solutions for UHV and XHV
6. In-Kind contributions to major projects, ESS, Hi-Lumi LHC and PIP-II

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