## Vacuum Technology Division
## Room Oregon Ballroom 203-204 - Session VT-TuP
## Vacuum Technology Poster Session

**VT-TuP-1 Measurements of NEG Pumping Performance at Cryogenic Temperatures***, **Sam Lodge**, P. Smith, A. Chew, N. Burch,* Edwards Ltd, UK*; D. Clement,* Gamma Vacuum*; P. Jones, P. Lamb, E. Lucchetta, P. Milner,* Edwards Ltd, UK*; T. Sinha,* Gamma Vacuum

Non-evaporable Getter (NEG) pumps are well established as a passive pumping technique in UHV and XHV applications. Recent studies comparing pumping speeds, sticking probabilities and capacities of Ti-V-Zr-Hf alloys at ambient and $LN_2$ temperatures will be reported.

Comparisons will be made with reported increased single element Ti and Ti alloy getters pumping performance at reduced operating temperatures.

**VT-TuP-3 Boosting Pumping Speed Simulations of Sticky Vacuum Components***, **Stefan Kiesel**, A. Trützschler, K. Bergner,* VACOM Vakuum Komponenten & Messtechnik GmbH, Germany

Transmission probabilities of gaseous species through vacuum components are commonly studied using molecular flow Monte-Carlo simulation software, like Molflow+ [1]. Particle transmittance depends on the sticking coefficient between particle and wall. Since the sticking coefficient is only roughly known and varies e.g. with temperature, wall surface materials, and surface coverage, a simulation is typically repeated for different sticking coefficients. Our recent publication has shown, the amount of necessary simulations may be reduced to one by counting the amount of wall hits of transmitted particles [2].
In the presented study, we have employed this novel technique to several geometries and developed simple calculations to evaluate NEG coated tubes.

[1] Recent developments of Monte-Carlo codes MolFlow+ and SynRad+, M. Ady, R. Kersevan, 10th Int. Particle Accelerator Conf., Melbourne, Australia - doi:10.18429/JACoW-IPAC2019-TUPMP037, https://accelconf.web.cern.ch/ipac2019/papers/tupmp037.pdf

[2] Boosting sticking-dependent transmission studies to a single TPMC simulation, S. Kiesel et al., Vacuum, Volume 210, April 2023, 111744 – doi: 10.1016/j.vacuum.2022.111744

**VT-TuP-4 Present Status of the SuperKEKB Accelerator Vacuum System***, **Yusuke Suetsugu**, K. Shibata, T. Ishibashi, M. Shirai, S. Terui,* High Energy Accelerator Research Organization (KEK), Japan*; M. Yao,* High Energy Accelerator Research Organization (KEK), Taiwan*; K. Kanazawa, H. Hisamatsu,* High Energy Accelerator Research Organization (KEK), Japan

The vacuum system of the SuperKEKB main ring (MR) consisting of 7-GeV electron ring (HER) and 4-GeV positron ring (LER), and the damping ring (DR) for 1.1 GeV positrons in the middle of the injector linac have been working well as a whole since the first commissioning in 2016. The maximum stored beam currents of MR are 1.46 A and 1.14 A for the LER and HER, respectively, and that of DR is approximately 30 mA, as of June 2022. The pressure rises per unit beam current are decreasing steadily. The new vacuum components developed for the SuperKEKB have been working as expected. No clear electron cloud effect has been observed in the LER so far after applying magnetic fields in the beam direction to the beam pipes at drift spaces in 2017. The recent behavior of the LER pressure against the beam current is explained by considering thermal gas desorption induced by the beam as well as photon-stimulated gas desorption. The beam lifetime is mostly limited by the Touschek effect due to a narrow dynamic aperture rather than the vacuum pressure, that is, the Rutherford scattering and Coulomb scattering. The challenges followed by high beam currents, such as damages of beam-collimator heads, excess heating of beam pipes at wiggler sections and so on, have recently become prominent. During the long shutdown time since July 2022 (called LS-1), we are installing a new non-linear beam collimator to reduce the beam impedances of collimator systems, exchanging the damaged collimator heads, replacing a beam pipe for the HER injection region to improve the injection efficiency, and installing the bellows chambers with photon masks in the wiggler section, together with maintenance works of the Belle II detector. The operation of the SuperKEKB will resume at the end of 2023. Here we will report the present status of the SuperKEKB vacuum system and the main works during the LS-1.

**VT-TuP-6 Complex Bend Vacuum Chamber for NSLSII-U***, **Robert Todd**, M. Seegitz, P. Palecek,* Brookhaven National Laboratory*; M. Ferreira,* European Spallation Source, Sweden*; D. Hidas, A. Khan, V. Smaluk, T. Shaftan, S. Sharma,* Brookhaven National Laboratory

While the NSLSII synchrotron is a third-generation light source providing outstanding brightness and flux, there is a robust R&D program in place to upgrade to a fourth generation, or beyond, facility. Inherent in the so-called complex-bend magnet and lattice designs are significant limitations on the beam and exit slot apertures of the vacuum chamber. These restrictions and the need for the vacuum chamber to be mechanically aligned and decoupled from the magnets impose unique challenges. As part of the design process, a thorough survey of existing fourth generation machines was completed to look at existing design solutions for accommodating beam and for providing adequate conductance and pumping. For our chamber, the selected solution is not novel and utilizes an aluminum split clamshell design that has been done in many machines past and present. The adaptation of this design along with improved machining and welding should provide the most cost-effective solution. The geometrical and impedance solutions and structural and thermal modeling will be shown along with dynamic pressure simulations generated by Synrad and Molflow modeling code. With continuing changes in lattice and magnet parameters, a systematic, iterative approach to vacuum design has been implemented and will be presented.

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