AKBP 2: Radiofrequency

Time: Monday 15:00–16:00 Location: GÖR 226

AKBP 2.1 Mon 15:00 GÖR 226

RF Measurements of the 750 MHz PIXE-RFQ — •Hermann W. Pommerenke[1,2], Yves Cuvet[1], Alexej Grudiev[1], and Ursula van Rienen[2] — [1]CERN, Geneva, Switzerland — [2]University of Rostock, Germany

As an Ion Beam Analysis technique (IBA), the Proton Induced X-ray Emission (PIXE) uses protons of a few MeV. Because of non-damaging character, it is used for the analysis of cultural heritage artwork. A transportable proton accelerator provides mobile access to ion beam analysis, avoiding the need of moving the artwork. CERN has recently designed and constructed the compact 1 meter long PIXE-RFQ operating at 750 MHz, which will provide 2 MeV protons for PIXE analysis. RF measurements and tuning of the PIXE-RFQ are presented. The results of RF measurements performed on the recently manufactured RFQ cavity are compared to the simulation results, demonstrating good agreement. Furthermore, the tuning procedure to obtain desired frequency and field distribution is described.

AKBP 2.2 Mon 15:15 GÖR 226

SRF R&D activities at the Universität Hamburg and DESY — •Marc Wenskat[1], Christopher Bate[1,2], Arti Dangwal Pandey[2], Isabel Gonzalez Diaz-Palacio[1,2], Ricardo Monroy-Villa[1,2], Timothy Nagel[1], Heshmat Noei[2], Detlef Reschke[2], Jörn Schaffran[2], Guilherme Dalla Lana Semione[1,2], Sven Sievers[2], Lea Steder[2], Vedran Vonk[2], Jonas Wolff[1,2], Robert Zierold[1], Wolfgang Hillert[1,2], Andreas Stierle[1,2], Robert Blick[1], and Hans Weise[2] — [1]Universität Hamburg, Hamburg, Deutschland — [2]Deutsches Elektronen-Synchrotron, Hamburg, Deutschland

The experience gained during the construction and commissioning of the world's largest superconducting linear accelerator, the European XFEL, forms the basis for current R&D activities on superconducting cavities by an international team of researchers including experts from RF and accelerator physics as well as surface and materials science. We explore empirically gained understandings and observed correlations within the SRF research field using modern material- and surface-physics methods. At the same time, we are constructing new diagnostic tools, developing surface and material treatments, and exploring alternative materials to improve this technology. This cutting-edge research creates new, exciting linkages between various disciplines combining diverse knowledge. Herein, we will give an overview of the current projects and topics of our research group

AKBP 2.3 Mon 15:30 GÖR 226

A quadrupole resonator for SRF R&D — •Ricardo Monroy-Villa[1,2], Wolfgang Hillert[1,2], Detlef Reschke[2], Jan-Hendrik Thie[2], and Marc Wenskat[1] — [1]University of Hamburg, Hamburg, Germany — [2]Deutsches Elektronen-Synchrotron, Hamburg, Germany

Radio frequency cavities used in particle accelerators and made from superconducting materials, *i.e.* niobium, have many advantages. In order to further improve their performance, a variety of different approaches can be applied and have to be investigated in detail. Instead of a rather complicated treatment of complex cavities samples of superconducting materials are studied to understand the material properties and their evolution under surface treatments, since they allow for an easier preparation and turn-around time at a lower cost. However, RF properties of superconducting samples, under the same conditions as SRF cavities, need to be studied as well to understand the influence of the material properties. A test cavity called quadrupole resonator (QPR) has been developed and operated at CERN and at Helmholtz Zentrum Berlin, which allows for testing samples under cavity conditions. In this work we report the status of such a test resonator developed and fabricated at Universität Hamburg and DESY. We present the results of a forensic study of the existing QPRs and how problems will be addressed in the new design. Fabrication tolerance studies on the electromagnetic field distributions, together with a status report on the current fabrication state, will be presented. In addition, the outline of two research projects using the QPR will be briefly addressed.

AKBP 2.4 Mon 15:45 GÖR 226

Microphonics Measurement and Compensation at MESA* — •Anna Kujawa, Florian Hug, and Timo Stengler — JGU Mainz, Institut für Kernphysik

A new electron accelerator called MESA is currently under construction at the Institute for Nuclear Physics at the Johannes Gutenberg-University Mainz. MESA stands for Mainz Energy Recovering Superconducting Accelerator and is going to be used to perform precision tests on the Standard Model at low energies. The centrepieces of the accelerator are two superconducting modified ELBE-type modules, the so-called cryomodules. In order to accelerate electron bunches, resonant fields of 1.3GHz are induced into the cavities resulting in standing waves. Since its bandwidth of 100 Hz is rather narrow, the resonance reacts promptly to any external vibrations giving rise to troubles guaranteeing a stable beam. These external vibrations are called microphonics. This talk presents measurements of microphonic effects on one of the cryomodules and future improvements to minimize external disturbance. Furthermore, a measurement of the full set of the cavities' resonance frequencies in a normal conducting environment is presented.

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