AKBP 13: Radiofrequency and Instrumentation II

Time: Friday 11:00–12:00 Location: ZHG004

AKBP 13.1 Fri 11:00 ZHG004

Design of a permanent magnet septum with variable field strength for ELSA — •Daniel Fry, Klaus Desch, Dennis Proft, and Michael Switka — Physikalisches Institut der Universität Bonn

As a way to greener accelerators and reduced power consumption permanent magnets have been a rising contender in the last years. For a first project in this field at the ELSA electron accelerator, a permanent magnet septum is designed and evaluated for its feasibility. Intended for a beam energy range of 0.5GeV−3.2GeV magnetic field stregths of 0.15T−0.97T need to be achieved. A mechanism with moveable Samarium-Cobalt (SmCo) magnets, which are chosen for their radiation hardness, is proposed. The magnets are moved from the iron yokes of the septum into a magnetic short circuit iron loop to cover the variable field strength. CST Studio simulations are used to evaluate possibilities to minimize the magnetic forces on this movement and the feasibility of the design. A simulation model is presented and further steps towards construction are discussed.

AKBP 13.2 Fri 11:15 ZHG004

Lattice Optimization for the MESA Injection and Recirculation Arcs Using ELEGANT. — •Esraa Khidr — Institut für Kernphysik, Mainz, Germany

The Mainz Energy-Recovering Superconducting Accelerator (MESA) is under construction at the Johannes Gutenberg University Mainz. MESA will enable a range of high-precision experiments in particle and nuclear physics through its dual-mode operation: External Beam Mode runs with 150 *A with polarized electrons at 155 MeV and Energy Recovery Linac (ERL) Mode with an unpolarized beam of 1 mA at 105 MeV. This work presents beam dynamics simulations for MESA's injection and recirculation arcs. We optimize the lattice design using the ELEGANT tracking code to achieve dispersion-free and small beta functions within the cryomodule. Additionally, the acceptance of the injection arc has been analyzed to ensure robust beam transport. These simulations are essential for ensuring MESA's successful operation in both modes.

AKBP 13.3 Fri 11:30 ZHG004

Beam-Dynamics Simulations for the ERL-Facility Concept DICE* — •Fatemeh Sadat Moujani Ghomi, Michaela Arnold, Norbert Pietralla, and Felix Schliessmann — Institut für Kernphysik, Technische Universität Darmstadt, Darmstadt, Germany

The Darmstadt Individually recirculating Compact Energy recovery linac (DICE) is a multi-turn energy-recovery concept in a racetrack structure with two linacs and separate beam transport. This layout allows to tune each arc individually with respect to transverse beam focusing and longitudinal dispersion. The latter enables sophisticated manipulations of the longitudinal phase space. In this contribution, beam-dynamics simulations addressing the tracking through certain sections of DICE are presented. For the tracking, the software ELEGANT is used.

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AKBP 13.4 Fri 11:45 ZHG004

Developing an Ion Beam Analysis Setup in Bonn — •Henry Schumacher, Dennis Sauerland, and Sebastian Neubert — Helmholtz-Institut für Strahlen und Kernphysik, Universität Bonn

The Bonn Isochronous Cyclotron can accelerate protons, deuterons and ions up to $^{12}C^{4+}$ with nominal ion energies of 7 to 14 MeV/nucleon. At one of the five beam lines, a new measuring station for material analysis is in development.
Initially the site will be equipped with two detectors for Rutherford backscattering (RBS) and two additional ones for particle induced X-Ray emissions (PIXE). Employing these two methods together provides the possibility to detect, identify and distinguish most isotopes. Utilizing this ion beam setup, it will be possible to analyze a wide variety of samples, such as biological, geological, archaeological and even pieces of art and items of historical value in a non-destructive manner. In this talk, an overview over the planned ion beam analysis setup as well as estimations on the setup's count rates for RBS and PIXE at the Bonn Isochronous Cyclotron are presented.