AKBP 17: Future Extensions of Existing Machines

Time: Friday 11:15–12:15 Location: E 020

AKBP 17.1 Fri 11:15 E 020

Arc design and simulations for the ERL-facility concept DICE — •Fatemeh Sadat Moujani Ghomi, Michaela Arnold, Lars Jürgensen, Norbert Pietralla, and Felix Schliessmann — Institut für Kernphysik, Technische Universität Darmstadt, Darmstadt, Germany

This contribution focuses on the design of an arc section for the ERL-concept study Darmstadt Individually recirculating Compact Energy recovery linac (DICE). The arc section consists of two vertical dog-legs and a total horizontal bend of 180°. Correspondingly, dispersion terms of both transverse planes must be controlled and, additionally, values for the longitudinal dispersion must be set depending on the operating mode. Here, the tracking software ELEGANT and its implemented optimization algorithms are used to find a suitable arc design and a proper behavior for the dispersion terms and beam envelopes. The overall goal is a compact design that can ideally be adapted for all arcs of DICE. We will discuss the parameters for a variable design of the arc sections of DICE and their justifications.

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AKBP 17.2 Fri 11:30 E 020

Recent developments of the cSTART project — Markus Schwarz, •Erik Bründerman, Robert Ruprecht, Axel Bernhard, Bastian Härer, Dima El Khechen, Anton Malygin, Michael Johannes Nasse, Gudrun Niehues, Alexander Papash, Jens Schäfer, Marcel Schuh, Nigel Smale, Pawel Wesolowski, Christina Widmann, Anke-Susanne Müller, and Matthias Fuchs — KIT, Karlsruhe, Germany

The combination of a compact storage ring and a laser-plasma accelerator (LPA) can serve as the basis for future compact light sources. One challenge is the large momentum spread (˜ 2%) of the electron beams delivered by the LPA. To overcome this challenge, a very large acceptance compact storage ring (VLA-cSR) was designed as part of the compact STorage ring for Accelerator Research and Technology (cSTART) project. The project will be realized at the Karlsruhe Institute of Technology (KIT, Germany). Initially, the Ferninfrarot Linac-Und Test-Experiment (FLUTE), a source of ultra-short bunches, will serve as an injector for the VLA-cSR to benchmark and emulate LPA-like beams. In a second stage, a laser-plasma accelerator will be used as an injector, which is being developed as part of the ATHENA project in collaboration with DESY and the Helmholtz Institute Jena (HIJ). The small facility footprint, the large-momentum spread bunches with charges from 1 pC up to 1 nC and lengths from few fs to few ps pose challenges for the lattice design, RF system and beam diagnostics. The Technical Design Report is currently being developed in cooperation with Research Instruments and subcontractors.

AKBP 17.3 Fri 11:45 E 020

Results of target tests for the ILC — •Tim Lengler[1], Dieter Lott[2], and Gudrid Moortgat-Pick[1,3] — [1]Helmholtz-Zentrum Hereon, Geesthacht, Deutschland — [2]Universität Hamburg, Hamburg, Deutschland — [3]DESY, Hamburg, Deutschland

For the planned ILC (International Linear Collider) new target tests were carried out at the Mainzer Microtron in 2023, where titanium samples and additional materials were irradiated with an intense electron beam. For these samples the material was studied with high-energy x-ray diffraction. As comparative study an experiment was carried out where the heating effect was isolated and studied in the same way. Changes in the microstructure were analyzed qualitatively and quantitatively.

AKBP 17.4 Fri 12:00 E 020

Transverse Resonance Island Buckets in Advanced Light Sources — •Michael Arlandoo — Helmholtz-Zentrum Berlin

Transverse Resonance Island Buckets (TRIBs) is a special optics mode where the storage ring is tuned close to a resonance so that a second stable orbit can be operated together with the main one. The two orbits can be filled independently with bunches to some extent and this opens new possibilities for different timing mode experiments. TRIBs is successfully operated at BESSY II and in this talk, we discuss the possibility of implementing it in the upgrade project BESSY III. A first-principles approach based on nonlinear dynamics is presented where the mechanisms that generate TRIBs at different resonances are made transparent.