AKBP 1: Electron Accelerators I

Time: Monday 16:45–18:15 Location: ZHG004

Group Report AKBP 1.1 Mon 16:45 ZHG004

Exploring cutting-edge research and technology at KIT's advanced accelerator facilities — •Erik Bründermann for the IBPT accelerator team-Collaboration — KIT, Karlsruhe, Deutschland

The Institut für Beschleunigerphysik und Technologie at the Karlsruhe Institute of Technology operates the Karlsruhe Research Accelerator, KARA, with the 2.5 GeV electron storage ring, the 40 MeV to 90 MeV short-pulse linear accelerator FLUTE, and KITTEN, a test center for energy-responsible research infrastructures. Combined with additional ATP facilities of the accelerator technology platform like the Magnet and Cryogenics Facilities, this is a perfect environment for accelerator research at KIT and technology transfer. In the future, cSTART - a compact storage ring ideally suited to study novel operation scenarios - and compact laser-plasma accelerators including a 75 TW laser system will expand the short-pulse facilities. We will explore the existing and upcoming accelerator test facilities at KIT and highlight results for accelerator physics and technologies.

Group Report AKBP 1.2 Mon 17:15 ZHG004

Recent Developments at S-DALINAC* — •Michaela Arnold, Adrian Brauch, Lisa Dingeldein, Manuel Dutine, Joachim Enders, Ruben Grewe, Katharina E. Ide, Lars Jürgensen, Maximilian Meier, Fatemeh Sadat Moujani Ghomi, Clemens M. Nickel, Norbert Pietralla, Vincent Pruy, Lukas Reichel, Valentin Reichenbach, Felix Schliessmann, Dominic Schneider, Benjamin Thormann, and Tim Zimmermann — Institut für Kernphysik, Technische Universität Darmstadt, Darmstadt, Germany

The superconducting Darmstadt linear accelerator S-DALINAC is a thrice-recirculating accelerator for electrons [1]. Besides the conventional acceleration scheme with corresponding nuclear physics experiments, the accelerator can also be operated as an energy recovery linac (ERL) [2]. Since its establishment in 1991, the S-DALINAC was mainly developed and operated by students. Multiple projects to improve the overall beam quality or the operational capabilities of the accelerator are currently in progress: A streak camera for investigating the bunch length, upgrades to the beamline and diagnostics system, support of beam tuning by machine learning techniques and more. A laser Compton backscattering setup is close to its commissioning. Lessons learned from the ERL operation are included in a design study for a future ERL. This contribution gives an overview.

[1] N. Pietralla, Nucl. Phys. News, Vol. 28, No. 2, 4 (2018).
[2] F. Schliessmann et al., Nat. Phys. 19, 597-602 (2023).

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Group Report AKBP 1.3 Mon 17:45 ZHG004

Current Developments at ELSA — •Michael Switka, Max Ammann, Klaus Desch, Frank Frommberger, Daniel Fry, Samuel Kronenberg, Thomas Perlitius, Dennis Proft, Paul Rolf, Yannick Schober, Susanne Speath, Axel Spreitzer, and Leonardo Thome — Physikalisches Institut, Universität Bonn

The electron stretcher accelerator facility (ELSA) at the University of Bonn utilizes a storage ring design to deliver a continuous 3.2 GeV beam of polarized and unpolarized electrons to external experimental stations. Alongside its main purpose to service the hadron physics community, additional modes of operation are developed to allow versatile usage for accelerator-, detector- and medical research. Current developments in beam polarization enhancement, beam diagnostics, electron source and permanent magnet design as well as modification of beam extraction schemes for medical research and a more economic usage for the detector testing community are presented.