ACCELERATOR SEMINAR (special)

Georg Heinz Hoffstaetter

Cornell University, Ithaca, NY

Tuesday, 22nd May at 4 p.m.

seminar room theory, south building (SB3 3.170a)

Planckstraße 1, 64291 Darmstadt

“CBETA, a 4-Turn ERL with SRF and Single Return Loop"

A collaboration between Cornell University and Brookhaven National Laboratory has designed and is constructing CBETA, the Cornell-BNL ERL Test Accelerator at Cornell University. Energy Recovery Linacs decelerate a used beam in SRF cavities to capture its energy and use it for the acceleration of new beam. CBETA is the first SRF ERL with multiple acceleration and deceleration turns. Another first is the larger energy-acceptance return loop that simultaneously transports 7 beams of different energy through a Fixed Field Alternating-gradient (FFA) lattice.

The ERL technology that has been prototyped at Cornell for many years will be used for this new accelerator, including a DC electron source and an SRF injector Linac (ICM) with world-record current and normalized brightness in a bunch train, a high-current linac cryomodule (MLC) optimized for Energy Recovery Linacs, a high-power beam stop, and several diagnostics tools for high-current and high-brightness beams. The beam is returned to the main linac (MLC) four times for acceleration before the beam is available for experiments; and it is then returned to the linac four times for deceleration, recovering its energy into the SRF system. All return passes lead through the same FFA lattice, developed by BNL and made of permanent magnet Halbach magnets.

CBETA will initially be used as a research facility for Electron Ion Colliders (EIC) that are planned in the US by BNL and JLAB. Both designs, eRHIC and JLEIC, have electron coolers with high intensity beams suitable for ERLs very similar to CBETA. Other projects relying on ERLs will also be mentioned.

GSI

Coordinator: Manuel Heilmann

Secretary: Paola Lindenberg

https://indico.gsi.de/categoryDisplay.py?categId=359

FAIR