Joint DESY and University of Hamburg Accelerator Physics Seminar

Tuesday, Novem,ber 20-th, 2007

(16:00 in Room 459/30b)

Longitudinal Stacking and Electron Cooling of Ion Beams in the ESR as a Proof of Principle for FAIR

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Abstract

A short overview of the FAIR project and the role of its storage rings will be given. The New Experimental Storage Ring (NESR) [1] of the FAIR project [2] is designed for versatile operation with highly charged radioactive and stable ions as well as antiprotons. In order to reach high luminosity for rare isotope beams fast longitudinal stacking combined with strong electron cooling is foreseen. Recently, as a proof of principle, two longitudinal beam compression schemes have been successfully tested in the Experimental Storage Ring (ESR) at GSI with a beam of bare Ar ions at 65 MeV/u injected from the synchrotron SIS18 [3]. The first scheme employs Barrier Bucket pulses, the second makes use of multiple injections around the unstable fixed point of a sinusoidal RF bucket at $h = 1$. In both cases continuous application of electron cooling maintains the stack and merges it with the freshly injected beam. The experimental results will be presented.

[1] C. Dimopoulou et al., PRST-AB 10 (2007) 020101.
[2] FAIR Baseline Technical Report, `http://www.gsi.de/fair/reports/`.
[3] C. Dimopoulou, B. Franzke, T. Katayama, D.Mhl, G. Schreiber and M.Steck, Proceedings of the Workshop on Beam Cooling and Related Topics (COOL07), Bad Kreuznach, 2007, to be published on `http://accelconf.web.cern.ch`.

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