

ACCELERATOR SEMINAR

“Ion Beam Accumulation and Short Bunch Formation with Beam Cooling”

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The accumulation of antiproton beam in the storage ring was successfully performed at CERN and FNAL with the use of a stochastic stacking system. In the original version of the FAIR (GSI) project such a concept of 3 GeV anti-proton beam accumulation was envisaged at the accumulator ring named RESR. However in the modularized start version of FAIR, the RESR was postponed and the new concept of antiproton accumulation in the High Energy Storage Ring (HESR) was strongly demanded. The barrier bucket (BB) system with stochastic cooling was found with simulation to have enough capabilities to accumulate the pre-cooled 3 GeV antiproton beam in the HESR up to 100 stacking. The Proof Of Principle (POP) experiment was performed at the GSI storage ring ESR with ion beams employing both the stochastic and electron cooling. The experimental results were in good agreement with the prediction of the simulation study.

The concept of BB accumulation with cooling could be applied to the planned Collider, NICA project at JINR where fully stripped ions, $^{197}\text{Au}^{79+}$, energy of 1.5~4.5 GeV/u ion beam is injected from the Nuclotron synchrotron. After the accumulation of enough intensity of ion beam in the collider as a coasting beam, the short bunch will be formed with the use of 500 kV RF with harmonic number 24, the number of bunch in the collider ring and the beam cooling.

In the present talk the concept and numerical investigation of BB accumulation and the short bunch formation including the IBS diffusion force and the space charge effects will be presented as well as the analysis of the POP experiment. The preliminary results of the investigation of possibility of stochastic cooling at MEIC project will be discussed.

Thursday, August 8, 2013

11:00 a.m.

CEBAF Center, Room F113

Coffee served before seminar at 10:45 a.m.