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Memo

DATE: *August 22, 2003*

TO: RHIC E-Coolers

FROM: *Ady Hershcovitch*

SUBJECT: **Minutes of the August 22, 2003 Meeting**

Present: Ilan Ben-Zvi, Andrew Burrill, Rama Calaga, Xiangyun Chang, Alexei Fedotov, Ady Hershcovitch, Jorg Kewisch, Vladimir Litvinenko, William Mackay, Christoph Montag, Thomas Roser, Dejan Trbojevic, Jie Wei.

Topics discussed: Simulation & Calculations.

Simulation & Calculations: Jorg opened the meeting by showing simulations of a system designed to test and to verify high current, energy recovery (utilizing a LINAC), which had never been demonstrated before. Building 939 is the planed site of the system. It will consist of a loop containing 4 90-degree dipoles, 9 or 11 quadrupoles, and one cavity. Electrons enter the loop from an injection line containing 3 dipoles, 3 solenoids, and an electron gun. The electrons are injected at an energy of 1.5 MeV and are accelerated by the cavity to 21 MeV. Before being sent into an electron dump, their energy is reduced (and recovered) to 1.5 MeV. The electron current consists of 5/7 nC bunches 20 psec pulse length at a frequency of 700 MHz. As Thomas and Ilan indicated, proof of principle computations are being presently done.

What Jorg showed was work in progress. One of the issues that must be resolved is a large energy spread in the electron bunches coming out of the gun. Ilan expressed surprise to the energy spread. Xiangyun explained that it is a result of phase relations and space charge. Ilan pointed out that the RHIC electron beam cooler, which has 10 nC bunches, does not have this problem, since the electrons come out of the gun at 2.5 MeV. The present issue is a consequence of operating the gun at 1.5 MeV. Vladimir asked whether the gun can run at a higher energy. Ilan's reply was that another klystron would be needed. Another topic being tackled by Jorg is beam breakup due to transverse fields in the cavity. It can be eliminated by having the sum of $m_{1,2}$ equal zero. Jorg is very close to achieving the goal.

A short discussion that was prompted by Vladimir resulted in a consensus that this system can be modified to test low energy ion cooling.

Rama concluded the meeting with the presentation of TDBBU simulations (of the RHIC E-Cool system), which showed that further optimization of the ERL loop, including rf focusing, can yield a beam-breakup threshold current of 3.06 A.