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Memo

DATE: *April 7, 2002*

TO: RHIC E-Coolers

FROM: *Ady Hershcovitch*

SUBJECT: **Minutes of the April 5, 2002 Meeting**

Present: Ilan Ben-Zvi, Michael Harrison, Ady Hershcovitch, Jorg Kewisch, William MacKay, Satoshi Ozaki, Triveni Srinivasan-Rao, Dejan Trbojevic, Dong Wang, Vitaly Yakimenko.

Topics discussed: Simulation & Calculations, 939 Setup.

Simulation & Calculations: Ilan opened the meeting by stating that at present two approaches to a cooler system are being considered. The two options are the current approach, comprising of a CW electron gun and an energy recovery LINAC, and the circulating ring approach. The later has the advantage of reducing the load on the gun and on the LINAC (in current thinking by a factor of 1000). The LINAC current is reduced from 50 – 100 mA to only 50 – 100 micro-Amp (Jefferson lab has 5 mA LINAC). Its feasibility has been enhanced by the development of a noiseless kicker.

Jorg continued the meeting with a report on follow-up simulation of the 939 setup. In the previous meeting (on March 22, 2002), Jorg showed a couple of schemes, based on a 360 degree "loop," (with water cooled and air cooled magnets) that would fit in 939. After using the tracking option in MAD, Jorg realized that the stretcher would not work as plan, since electrons end up in the "wrong" position because the difference in path-lengths through the dipole is not proportional to the energy spread. Replying to Ilan's suggestion to increase energy spread in the cavity, and to Dejan proposal of rectifying the problem with quadrupoles, Vitaly pointed out the there is no simple solution. However, at the end of the discussion, the consensus was that the previously presented "loop" might work after a redesign.

On the topic of the recirculating beams approach, Ilan indicated that no stretcher is needed in the ring; the beam is to be "stretched" before injection. One LINAC may serve two RHIC rings. Satoshi asked about the number of bunches in a ring, and about electron beam heating during the cooling process; Ilan replied 3 for the first and a very slow rate to the later. Ady asked what happens to the electrons after 1000 turns. Ilan's reply was that no decision was made. One option is to send those electrons through the LINAC for energy recovery to prevent energy droop of accelerated electrons. Satoshi questioned the need for a superconducting LINAC. Ilan replied that superconducting LINACs are commercially

available at reasonable prices. Furthermore, since operation is steady state, energy loss considerations may preclude the viability of conventional LINACs. Mike asked about relaxing the stringent thermal gun design. Vitaly and Ilan said that by keeping the present design, field gradient and hence beam brightness can be increased.

939 Setup: Triveni reported that the safety review process is in progress. Initial hazard document was given to Woody Glenn and a meeting will be scheduled next week. The laser was ordered by AES. Machining and electron beam welding of the superconducting cavity has been completed; it is going for surface preparation.

On the subject of cathode surface preparation, Dejan claimed that molecular beams are superior to vapor the planned deposition. Triveni's answered that poisoning is the limiting factor, and with deposition maximum quantum efficiency is reached. Ady suggested exploring the use of a porous molybdenum cathode for vapor injection through its back.

Finally, Triveni reported that contrary to what was said in the March 1, 2002 meeting, AES will not provide a low current beam stop. A 1 mA, 2 MeV beam dump will be needed.