

DATE: April 12, 2002

TO: RHIC E-Coolers

FROM: Ady Hershcovitch

SUBJECT: **Minutes of the April 12, 2002 Meeting**

Memo

Present: Ilan Ben-Zvi, Michael Harrison, Ady Hershcovitch, Jorg Kewisch, Derek Lowenstein, Stephen Peggs, Triveni Srinivasan-Rao, Dejan Trbojevic, Dong Wang, Vitaly Yakimenko.

Topics discussed: Recirculating Ring Option.

Recirculating Ring Option: during the April 5th meeting Ilan stating that two approaches to a cooler system, a CW electron gun with an energy recovery LINAC and a recirculating ring approach, were being considered. Ilan opened this meeting by stating that after subsequent meetings in smaller groups, the recirculating ring approach seems to have advantages that make it the prime candidate. However, there are a number of critical issues that must be addressed. Therefore, Jorg is going to Jefferson Lab to learn more about this option (primarily from Derbenev).

The topics on Jorg's agenda are: magnetized beam transport, recirculating ring design, energy recovery LINAC, and beam – beam tracking program. On the topic of magnetized beam transport, two schemes for maintaining magnetization, are to be examined. One scheme involves choosing certain phase relations between beam entrance into and exit from the solenoid. In the other scheme, the beam is converted into a flat beam at the solenoid exit and back into a round beam before reentering the solenoid. Jorg will find out whether Derbenev has a design concept for the recirculating ring, and discuss the following topics:

1. Is it possible to circulate a magnetized beam with no conversion to a flat beam?
2. What are the limiting mechanisms for a large number (~1000) of turns in the ring?
3. What optics does he recommend for the ring?
4. Is there a cumulative increase of emittance each time one converts back and forth between a flat beam and a round-magnetized ring?

An additional objective is to hold discussions about the Jefferson Lab FEL energy recovery LINAC and to study its operation. The final objective is to learn about their beam – beam tracking program.

Most of the meeting involved discussions that essentially compared the two approaches. Basically, feasibility of the recirculating ring approach has yet to be confirmed due to

unresolved physics questions (especially) regarding magnetized beam transport. By comparison, the CW electron gun with an energy recovery LINAC is harder to implement technically. Dejan mentioned an early approach to cooling RHIC using a storage ring, and asked why was the ring approach abandoned. Ilan answered that storage rings were considered earlier. They have larger beams and requiring additional magnets. No conclusion can be reached before Jorg's return with crucial information. Derek pointed out that we must prove that there are no showstoppers in about 2-3 months, since a decision must be made before CD0 is sent to DOE in mid September.