

Memo

DATE: September 20, 2002

TO: RHIC E-Coolers

FROM: Ady Hershcovitch

SUBJECT: **Minutes of the September 20, 2002 Meeting**

Present: Ilan Ben-Zvi, Xiang Yun Chang, Ady Hershcovitch, Jorg Kewisch, Thomas Roser, Triveni Srinivasan-Rao, Dejan Trbojevic, Dong Wang, Jie Wei, Qiang Zhao, Yongxiang Zhao.

Topics discussed: Simple Physical Model, Simulation & Calculations, RF Cavity Studies.

Simple Physical Model: in the August 16th meeting, Ilan initiated a discussion on layman view of intra-beam scattering (IBS) aimed at developing a simple pictorial model for IBS. During that meeting, Ilan and other participant suggested various models. After the meeting, following discussions with Jie Wei and working with Lisa Jansson of Graphic Arts, Ilan made a picture. The picture was shown in a previous meeting and various contributions were made towards improving the layout of the picture, which he distributed last week. The feedback was very good. Before proceeding with today's meeting, Ady received no reply to his question on whether anyone sees any problem with the model. Below is the pictorial model.

Simulation & Calculations: Dong showed preliminary results from new beam breakup calculations. He started to work on these calculations with Nathan Towne from NSLS. Beam breakup occurs due to instabilities in a LINAC that is caused by beam wake-field interaction. Originally, current threshold for instability was thought to be 57 mA. These new computations indicated that the threshold is at about 120 mA. Ilan pointed out that calculations from Cornell generated similar numbers. In answer to Thomas' question regarding the effect of frequency on the threshold, Ilan replied that at 700 MHz the threshold should be doubled. Next, Jorg described a stabilization scheme (in case beam breakup does occur) to cancel beam breakup by running the beam backward in the LINAC. Phase has to be adjusted in such a way that the bunches just miss each other. Basically, the news is good.

RF Cavity Studies: Yongxiang gave an extensive presentation on studies conducted at AES on the problem of cross-talk, between launcher and pickup probe, at the superconducting electron gun cavity (for the upcoming experiment in 939). Usually, this problem does not exist, since launchers and pickup probes are at opposite ends of cavities. In this case they are at cavity's exit facing each other, and "cross-talking." An extensive series of experimental measurements and calculations were performed to determine the various coupling coefficients. With this knowledge, probe and launcher sizes can be optimized. And the launcher can now be designed optimally.

