

# AP Video Conference (November 28, 2000)

## Attendance:

ORNL: Sarah Cousineau, Marc Doleans, Sasha Aleksandrov, Sang ho Kim, Dong O Jeon, Slava Danilov, Paul Chu, John Galambos, Deepak Raparia, Weishi Wan, George Dodson.

BNL: Y.Y. Lee, Jei Wei, Bill Weng, Mike Blaskiewicz, Alexei Fedotov, Nuria Catalan-Lasheras, Ioannis Papaphilippou.

LANL: Jim Stovall, Bob Gluckstern, Subrata Nath, Sergei Kurennoy.

LBNL: Rod Keller, John Staples, Rick Gough.

JLAB: Ron Sundelin.

## 1) Re-Baseline Parameter Table and AP Plan

Jei Wei presented some highlights:

- a. There is a need to maintain the same space charge tune shift so that the ring performance remains the same. Multiplying by ratios of  $\beta^2\gamma^3$  (for constant tune shift) for 840 MeV vs. 1 GeV gives intensity of  $1.5e14$  protons, and new power of 1.2MW. The duty cycle would be dropped from 6% to 4.4% to accomplish this.
- b. The front end and warm linac will remain the same, with the superconducting linac changing to accommodate the new energy.
- c. Injection goes from 1060 turns to 745 turns. This reduces average foil heating.

Comments & Discussion:

LBNL argued that it would be more reliable to drop the current than to drop the duty factor.

YY Lee noted that without sextupoles and energy spreaders, the machine cannot attain the desired 1.2 MW; the best that can be guaranteed without this equipment is 0.6 MW.

Mike Blaskiewicz presented plots of the longitudinal beam distribution with and without energy spreaders. The plots indicated that the beam was indeed more sharply peaked in both dimension when energy spreaders were not employed. The results did not incorporate space charge effects. John Galambos said that he

had previously done similar simulations with space charge turned on and that the effect of this was to lessen the peak gradients.

Alexei Fedotov lead some discussion on space charge tune shifts, emphasizing the need to keep space charge tune shifts the same compared with the October baseline (even by 10-20%). He stated that all correction schemes including sextupoles are required if we want 1 MW and higher machine with low losses.

Yannis Papaphilippou defended his previous arguments for sextupole magnets in the ring: The ring momentum acceptance is quite large ( $dp/p=\pm 2\%$ ). Thus, the natural chromaticity gives tune-spreads of the order of  $\pm 0.15$  (as the space-charge). Dynamic Aperture (DA) simulations show that there is an unacceptable drop of the DA without the use of chromatic sextupoles, especially for  $dp/p=-2\%$ , when off momentum particles cross the vertical integer resonance (@ 6.0) due to this huge chromatic tune-shift of 0.15.

## 2) **Linac/Ring dumps; HEBT cavities** (Deepak Raparia)

Current dump capabilities:

- 1) Linac Dump – 7.5 KW
- 2) Extraction Dump – 7.5KW
- 3) Injection Dump – 200 KW

Dumps have been designed for 1 GeV and no other energies have yet been considered.

## 3) **SCL/HEBT common quad possibility** (Deepak Raparia)

Common quads will not be possible because of aperture/dispersion restrictions. At least one quad must have a larger bore (21 cm) than the other 8 cm quads. Jim Stovall called for a design review of the magnet before releasing the purchase order.

## 4) **Extraction Kicker.**

Ring extraction kicker simulation and experimental results were discussed. New simulations by Sergey Kurennoy employed a different winding scheme than the previous simulations. The new results are that the impedance is still reduced for both the transverse and longitudinal directions, while the magnetic field quality remains good.

YY Lee presented experimental measurements of a small model of the kicker. His measurements indicate the impedance of the kicker is reduced by a factor of 2.

## **5) Cavity & magnet/survey database (John Galambos).**

John stated that JLAB will be taking the lead on the cavity database, and will pass it down once they are finished. He also expressed concern over the naming conventions. Although guidelines have been established for these conventions, there is a lot of flexibility within these guidelines and this gives rise to differences in naming schemes between accelerator lines.

Concerning the application programming status, John said that Jim Stovall has comprised a list of general-purpose tools and applications. Fake signals have been generated and are now available for use in applications programming, and some simple client examples (high level) have been created.

## **6) E-P Review Summary**

A review for the e-p research project was held on Nov 20-21, even though project funds will most likely be cut. The general opinion was that although the Princeton work may eventually prove valuable, the effort is at present very academic and results pertinent to SNS will not be available within a reasonable time frame. Closeout costs are being discussed, with the idea that some money will remain to fund recently hired post-docs, and that some of the research will be continued by members of the ORNL and BNL teams.

## **7) Miscellaneous Dates**

- 1) Diagnostics Workshop – Dec 13-15.
- 2) Linac/Ring Interface meeting – Dec. 12.
- 3) HEBT/Linac Interface meeting – Dec. 12.
- 4) Next video conference – Dec. 12.