Lenny Rivkin
January 18, 2006

Dear Barry,

I apologize for entering my comments so late, quite a few points have already been answered in the GDE-EC responses document (especially the 'parameter plane' discussion). A couple of remarks I would still like to make will concern the damping rings.

A lot of very good work has been done on the damping ring systems and the BCD recommendations and the large number of alternative lattices studied and summarized in the tables provides rich resource for making an optimized choice. It is my feeling that this choice in turn will have to be made after some thorough analysis of the measures needed to ***keep the thermal and mechanical stability of the complex under tight control***.

Constant heat load on the vacuum chamber

One of the main issues is to avoid BPM mechanical movements that would be providing the feedbacks with disinformation. This affects low emittance tuning, positional stability etc.

- Antechamber with localized absorbers design that avoids synchrotron radiation directly hitting the chamber will go a long way towards avoiding large temperature gradients and keeping the heat load on the chamber constant.
- NEG coated vacuum chamber is very promising, the coating technology and its quality control are under development e.g. at the light sources.
- Tunnel air temperature stabilization
- Cooling water temperature stabilization
- Would probably argue against sharing of the tunnel by positron and electron damping rings or by damping rings and a part of the linac

Constant current in the rings

The variety of possible running configurations ('parameter plane'!) should be considered carefully in view of potential cost optimization if one restricts the running conditions to a narrow range of parameters, e.g.

- Beam diagnostics system may not need very linear response over a large range of operating currents
- Similar optimization may be possible for the RF and bunch-to-bunch feedback systems

Wiggler technology alternative

In addition to the three technology options mentioned in the BCD (hybrid permanent magnet, normal and super conducting electromagnets) the cryo-cooled (150°K) permanent magnet technology proposed by Kitamura (Riken/SPring8) a few years ago may provide an interesting alternative:

- 30 – 50% higher field
- higher coercivity (factor 3)

- High resistance to radiation damage

It may change the wiggler parameters optimization assumed in the BCD. This technology is being developed now at the light sources.

Magnets/Girders technology alternative

High degree of integration of the ring components, e.g. combining the magnets and girders into one piece, as an alternative technology, may bring substantial cost benefits in addition to reducing the sensitivity to vibrations and simplifying the alignment. This development is being pursued by MAXLab (Lund University, Sweden).