

Comments on the Straw

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Dear Barry,

These are my first impressions on the ILC Strawman Report (Nov. 24, 2005). I have not yet read every sentence on the report, so the answers may have been already written there. Also I have not discussed each issue with ILC people at KEK. I do not mention on the main linac, though it has the largest volume in the report, except for the choice of the gradient.

I will continue to look at it and hopefully write more.

Regards,

Katsunobu

1 Baseline Parameters

The Strawman wishes to have some flexibility on baseline parameters such as particles/bunch, bunches/pulse, etc. It may seem to be more reasonable than a conventional design with one parameter set, but it can be just an appearance issue. If we combine all parameters with the hardest values, we simply get a design with $5E34$ luminosity. So this is a design with one parameter set at $5E34$.

I do not believe such a high luminosity is necessary for physics anyway. What happens if we design a machine with one parameter set at $2E34$? We will still have flexibility, but any change of a parameter just decreases the luminosity. I guess by doing this you can reduce the cost, which is the most important issue for GDE. As such a "one parameter set" design has been established in the HEP community for years, nobody will complain even the design luminosity is not achieved instantly.

2 Gradient

According to the TTF experience, the accelerating structures have wide distribution on the maximum gradient. To reduce the width of the distribution will need more effort on the R&D and fabrication process. I would like to suggest an rf system which can incorporate different

gradient module by module (or section by section, cavity by cavity). The system should handle different gradient, different power, different tuning. This scheme allows the design with higher average gradient by just using the average of the gradient distribution instead of the lower edge which is currently used in the Strawman. The you can reduce the total cost.

3 Undulator e+ source

I have a few questions:

- How about the energy/orbit acceptance of the undulator for the 150 GeV beam?
- What kind of accuracy of the energy/orbit control for the incoming beam?
- What is the possible damage on the undulator by mishandling the incoming beam?
- What about the design of the collimation section to protect the undulator?
- If we do not have polarization at the beginning, can we reduce the length of undulator by assuming the acceptance of DR in Fig. 3 (p. 43)?
- What about the depolarization from the target to DR?

4 Damping Ring

I still think that the Dogbone or its variant is a good choice, but 6 km rings may have some merits.

One merit is we can start with one 6 km ring/beam and commission them. If they overcome ion/ecould issues, that's it. This may be the cheapest case even compared to the Dogbone. If we have such problems we can still add second or third rings for each beam. If the budget is limited we may choose energy or luminosity in such case.

The Dogbone is definitely safer on the e-cloud than 6 km. Also for ion, but not perfectly, as the ion accumulation in the coupling bump is more serious than 6 km. Dynamic aperture, wigglers, space charge are manageable but need more careful operation than 6 km. I think 6 km is more trivial and less interesting than the Dogbone.

The key element for 6 km is the fast kicker. The impedance and heating of the fast kickers must be estimated. it is necessary to build a realistic prototype and test it in a ring with similar bunch current and bunch spacing, e.g. PEP-II or KEKB.

5 Beam Delivery

I am a little bit curious to examine the final focus optics by myself comparing to the “best” conventional optics (such in the JLC design). I do not have any specific question there, but just would like to convince myself with my code.

6 Sample Site

The sample site study causes very nervous issue in Japan, once any specific name is mentioned. Careful agreement are necessary among bureaucrats, local governments, politicians, and residents. It takes time. Once this kind of project becomes open without such agreement, it will be quite vulnerable to die (by just one question at Diet, for instance). So if you need participation of Japan to the ILC for the time being at least 5 years or so, you should avoid such study with specific name. Probably it would be better to request GDE-ASIA to bring a virtual site which mixes characteristics of possible candidates in Japan.