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December, 2006
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Prof. Maury Tigner,
Director, Cornell Laboratory for Accelerator Sciences and Education,
Laboratory for Elementary-Particle Physics (LEPP),
Cornell University, Ithaca, NY

Dear Maury,

It is my pleasure to write the comments on the use of CESR as a test accelerator for ILC damping rings:

1. Necessary R&D items for ILC damping ring

Since I have done many R&D's for linear collider with KEK-ATF group since 1993, I can imagine a lot of necessary R&D items for ILC damping ring before TDR (Technical Design Report) completion. More sophisticated beam tuning technique to realize very flat beam (vertical emittance less than 2pm) will be continuously developed according to the upgrade of accelerator computer modeling. I am sure that we have to demonstrate the cure of electron cloud instability with low emittance positron multi-bunch beam before TDR completion. Also, super-conducting damping wigglers which is related to electron cloud instability, impedance problem and horizontal to vertical coupling source should be successfully developed and tested without problems on beam dynamics until TDR writing. Of course, development of 650MHz super-conducting RF acceleration system and its test have to do in high current storage ring before TDR completion.

2. Present situation on R&D for ILC damping ring

You know KEK-ATF is going to develop the beam tuning methods, fast kicker system, study on fast ion instability, CSR instability and advanced beam instrumentation using multi-bunch electron beam from 1.3GeV S-band linear accelerator. Recently we removed normal damping wiggler magnet system from the damping ring because the technology as main linear accelerator was fixed on 1.3GHz super-conducting cavity and society of ILC damping ring selected super-conducting wiggler system as the damping wiggler. From autumn 2008, we will start the beam commissioning for ATF2 which is final

focus beam line to demonstrate the realization of 35nm beam size for a long period. Then, we will reduce the research activities for ILC damping ring at the ATF because we have to concentrate the beam experiment for ATF2 project from autumn 2008. However, I want to keep several activities to develop the beam tuning methods and advanced beam instrumentation as the complementary activities to the CESR as a test accelerator for ILC damping rings. Storage rings with small emittance beam, PEP-II and KEKB can Partially contribute the R&D for ILC damping ring but we do not expect the complete R&D from them since they have clear purposes.

3. Another necessity

We are usually considering the education of young students, technicians, physicists and engineers. Appropriate research programs with real machine (high energy accelerator, not virtual machine which is made by computer.) are very important to make real experiences. Our KEK-ATF has educated lots of young students, physicists and engineers more than 200 during 10 years. If you will keep the operation of CESR as a test accelerator for ILC damping rings and upgrade it to achieve very flat and high current beam, you will find a lot of significant research programs for the education and contribution to ILC.

4. Recommendation

From the comments above, to provide a facility for damping ring tests that will be available before ILC-TDR completion should be recommended. Activity coordinated by LEPP, with collaborator involvement for physics studies and system tests should be kept with appropriate budget and staffs. R&D topics should include: electron cloud studies (with particular focus on growth and amelioration of electron cloud in the wigglers); low emittance operation over full range of ILC bunch currents; system prototype tests; beam tuning study to realize 2pm vertical emittance; electron cloud instability threshold measurement.

Best regards,
Junji

Sincerely yours,



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