

## Minutes of Meeting #8

WebEx, Wednesday, 24 January 2007

*Present: Eckhard Elsen, Jie Gao, Susanna Guiducci, Tom Mattison, Mark Palmer, Mauro Pivi, Junji Urakawa, Marco Venturini, Andy Wolski, Mike Zisman.*

### 1. Comments on Minutes of Meeting #7 (WebEx, 6 December 2006).

No corrections.

Action items:

- *Andy to check database information on ANL resources.*  
Done. The value given for M&S for Activity 2.2.1.F reflects accurately the value provided by ANL. Any issues regarding this proposal will be resolved as part of the on-going US discussions over budget and R&D plans.
- *Marco and Mauro to revise existing drafts of R&D Plan Work Packages 2.2.1 (single-bunch instabilities) and 2.2.3 (electron cloud), to remove "Proposed" resources, and replace them with "Required" resources (i.e. an estimate of the resources actually needed to complete the tasks detailed in the R&D Plan).*  
The electron cloud work package has been updated; a revised version of the single-bunch instabilities work package will be available within the next few days.

The electron cloud work package now specifies the estimated resources required to complete the R&D tasks, rather than the resources proposed by the various groups. The anticipated effort required in 2008 and 2009 is 14 FTEs. This is an increase of nearly a factor of two over the present level of effort, partly justified by the need to test the effectiveness of clearing electrodes in suppressing the build-up of electron cloud. (The resources indicated for 2009 is a rough estimate, based on a small increase over 2008). Only those investigators to be supported by the indicated resources are named. It would be helpful, for managing budgets and resources, to indicate roughly the fraction of time that each investigator would spend on the activity. The list of named investigators is not complete: there are generally more people at each institution who make some contribution, besides those named. To provide a more complete picture of the resources, it could be helpful to give the number of FTEs represented by "unnamed investigators".

It would be helpful to integrate the structure and resources being developed in the R&D plan work packages into the R&D database, to allow more effective handling of the information.

**Action:** Andy to consider how to extend the database to incorporate the developing R&D plan.

Any organisation of the work needs to be compatible with the anticipated restructuring of the GDE, and of the ILC organisation as a whole. It is not clear how to address this issue at present, since plans for the ILC organisation are still not completely clear.

- *Andy to circulate information on present resource levels integrated over all damping ring activities, to provide context for estimates made for specific work packages.*  
Done.
- *Those designated should continue preparation of the Work Packages.*  
See updates below (agenda item 3).
- *Andy to send a preliminary announcement of the next damping rings mini-workshop to the damping rings email list.*  
Done. See agenda item 4.

## 2. a) Update on kickers R&D.

Junji presented an update on kickers R&D at the ATF. There have already been several tests of low-amplitude pulsers at the ATF; there is now a firm proposal for development of the extraction system to allow extraction of individual bunches within a bunch train. This would involve installation of two 30 cm strip-lines, driven by  $\pm 10$  kV pulsers, and a new septum. A “slow” closed orbit bump will be needed to bring the nominal orbit (without kick) sufficiently close to the septum, that the additional deflection from the kickers will extract a bunch. Apertures should be sufficient for injection and extraction with minimal beam losses. A decision as to how to proceed with this upgrade will be made at the end of March.

Presently, the LLNL inductive adder pulser is being used for tune measurements at the ATF. So far, the voltage at which this device can be tested has been limited. Potentially, it can provide a higher voltage kick than possible from other available devices, but the rise/fall times are rather longer than would be needed for ILC. Nonetheless, it may be interesting to perform some high-power tests ( $\pm 8$  kV).

**Action:** Junji to send details to Tom, regarding the use (and proposed use) of the inductive adder pulser at the ATF.

Plans are also being made for studies of fast ion effects. A meeting will be held at KEK late in February.

**Action:** Junji to confirm dates of ion effects meeting at KEK, when known.

Mark presented a brief update on progress at FID. After the Cornell R&D meeting in September, Efanov re-examined the architecture of the present FID device, and has developed a new design. He is about half-way through assembly of a new prototype, which has specifications that look very promising. If successful, the new design would achieve amplitudes of 7 – 10 kV, with 1 ns rise time (1.5 – 2 ns pulse width at 90% peak height), maximum pulse repetition frequency of 3 – 6 MHz in “burst” mode. It is estimated that a bench prototype will be completed by the end of April 2007: this is timely in the context of the ATF studies. The expected pulse stability is not clear at the moment.

The funding situation is difficult. It is expected that Efanov would be willing to demonstrate his prototype, but for beam tests, a device would have to be purchased. Cornell has no more funds available for this. It is possible that KEK could buy one or two units for tests at ATF in the next fiscal year.

Mark will coordinate communication with Efanov. Junji will visit FID in Hamburg in June (with Naito-san) for discussions, and to get a better understanding of how the device works. Eckhardt is also interested in making contact.

SLAC/LLNL are thinking about future work, and revising their R&D plan for kickers. It is recognised that the relatively slow rise/fall time of the inductive adder may limit the applicability of this device for ILC. However, it may be possible to combine the inductive adder with the DSRD (developed by Anatoly Krasnykh) to provide a more effective pulser. An updated plan should be available shortly; Tom will try to get some information on this, which would be very helpful to have as he prepares the R&D work package on the fast injection/extraction kickers.

## **2. b) Discussion of Damping Rings R&D Plan Work Package 3.5.1 – Fast Injection/Extraction Kickers.**

Thanks to Tom for preparing a draft of Work Package 3.5.1. The work package is still somewhat incomplete, and only the Very High Priority Objective 3.5.1.1 (develop a fast, high-power pulser) has been developed in any level of detail.

The question arose as to whether we want to include a list of names of those involved in the R&D at the start of the work package description. It was agreed that this can be helpful in providing a list of contacts at different institutions. At least those leading the work in each group should be listed.

A list of resources approved/requested/desired for kickers R&D would be helpful in drawing up the R&D plan. It was noted that the resources information in the database is by now, somewhat out of date. The present information should still provide some guidance in developing the R&D plans, but does need to be updated before too long.

**Action:** Andy to send Tom latest information on resources from the database.

To what extent do we anticipate individual laboratories taking leading roles on different R&D projects? This question is connected with the expected reorganisation of the GDE, in moving from the RDR to the EDR phase. In this context, it is particularly relevant because R&D into different pulser technologies is being carried on almost independently by different laboratories. So far, this seems to be working satisfactorily; however, since demonstration of a pulser meeting ILC specifications is a very high priority objective, some re-examination of the situation seems appropriate. In particular, the leading candidate at present, the FID pulser, is based on proprietary technology, and this situation has certain risks. It was felt that it would be helpful to try to identify a single laboratory, with sufficient resources, that could act as a partner institution for FID.

**Action:** Tom to contact institutions actively or potentially involved in kicker development, to explore the possibility of nominating one laboratory to partner FID in developing fast kickers for ILC, and to try to identify possible candidates for this role.

There are other techniques or technologies that may be helpful for developing kickers that meet the ILC specifications. These include ferrite pulse-sharpeners, and switches produced by Behlke. The R&D plan should include consideration of these alternatives.

### 3. Progress with R&D Plan Work Packages.

- Lattice design (Mike Zisman): No documentation yet. The R&D meeting at Frascati will provide valuable input.
- Low emittance tuning (Mike Zisman): No documentation as yet. The R&D meeting at Frascati will provide valuable input.
- Single bunch impedance (Marco Venturini): A revised draft is expected shortly (to include specification of estimated resources needed to achieve the R&D objectives).
- Electron cloud (Mauro Pivi): A revised draft was discussed at this meeting (see agenda item 1).
- Ion effects (Marco Venturini/Mauro Pivi): No documentation yet. The R&D meeting at Frascati will provide valuable input.
- Injection/Extraction Kickers (Tom Mattison): An initial draft was discussed at this meeting (see agenda item 2).

**Action:** Those designated should continue preparation of the Work Packages.

### 4. Next Damping Rings Mini-Workshop, 5-7 March 2007, Frascati.

A draft web page has been produced, and will be made live shortly, allowing people to register. The following people are proposed for conveners (\*confirmed):

- Ion effects: Marco Venturini\* and Guoxing Xia
- Lattice design: Susanna Guiducci\*, Mark Palmer\* and Jie Gao
- Low emittance tuning: Mike Zisman\*, Kiyoshi Kubo and Yunhai Cai

**Action:** Susanna to make the web site for the meeting “live”, and confirm with Andy when this is done.

**Action:** Andy to send a notification to the damping rings email list when it is possible to register for the meeting on the web site.

**Action:** Working group conveners to contact possible contributors, to invite them to present talks.

**Action:** Andy to contact Maxine regarding setting up an indico page for the proceedings.

Junji will be able to attend the Frascati meeting, with Kubo-san and Naito-san. Arrangements should be made for Naito-san to provide an update on kicker R&D at the ATF.

It was noted that there should be more follow-up from the R&D meetings, and generally better communication on R&D activities. S3 did agree to implement a mechanism for this, which would be regular telephone meetings on specific

damping rings R&D sub-topics (electron cloud and impedance issues; kickers; etc.)

**Action:** Those responsible for specific R&D topics to organise regular phone meetings for communication on R&D activities.

## 5. BILCW07, 4-7 February 2007, Beijing.

Total attendance at BILCW07 is expected to be around 230, split approximately half-and-half between the physics groups and the GDE (machine) groups. Staff from IHEP and other laboratories in China with expertise needed for the damping rings will be attending the meeting; it will be a good opportunity to discuss more extensive involvement in the R&D programme by these labs.

Junji will give an overview report of damping rings R&D activities during the RDB plenary session. Other members of S3 attending the meeting will include Mike, Jie, Susanna and Eckhard. Detailed planning for future activities may be better done at the damping rings R&D meetings, where there is a wider attendance by those presently involved in current damping rings R&D activities. However, BILCW07 presents a good opportunity for communicating with experts in China who may not be so closely involved at present.

One parallel session could include talks on:

- DR lattice (IHEP)
- BEPCII vacuum chamber (IHEP)
- DR studies at ANL (Kwang-Je Kim, ANL)

The programme has not yet been finalised.

**Action:** Mike, Jie, Susanna to organise damping rings sessions at BICW07.

## 6. Future Meetings

We should try to meet by WebEx every two weeks. Future dates are:

- February 7: cancelled for BILCW07
- February 21
- March 7: cancelled for the damping rings R&D meeting at Frascati
- March 21
- April 4
- April 18