

Summary of discussion in Jan. 25 afternoon session of ATF2 Project meeting.
(DRAFT by K.Kub, and comment by P.Bambade)

Since it is very hard that we can achieve 37 nm beam size at bunch population 1 or 2E10 near future, it is necessary to define realistic “Goal 1”. It is probably demonstration of chromaticity correction comparable to ILC BDS at lower intensity. It is need to consider the low intensity beam has small energy spread and make chromaticity effect weak.

(1) The first priority to do is:

Reproduce and re-confirm ~70 nm beam size at low intensity.

Then, try all tuning knobs and see what the minimum achievable beam size is.

The study will be done without major hardware change.

We use the 10x1 ($\beta_{x^*} 40\text{mm}$, $\beta_{y^*} 0.1\text{mm}$) optics.

(2) Then, study two issues A and B as follow. Still using the 10x1 optics.

A. Investigation of the reasons of strong intensity dependence (wakefield?).

Ref cavity scan:

Scan ref cavity in wider range?

Compare IP-wire and IPBSM at high intensity.

Consider installing a movable dipole cavity BPM.

Consider installing a (tapered) collimator for reducing background of IPBSM.

Calculate wake-potentials of structures in the beam line, and consider hardware change if necessary.

B. EXT emittance study and reduction

Study of effects of alignment changes of the kicker and the septum magnets.

This will need much hardware work and affect other studies. Probably need a special dedicated week. Need negotiation with other study groups.

Keeping DR emittance small (10 pm level) is also important, but it is not clear whether further emittance reduction is necessary/effective for reducing EXT emittance.

(3) At some point,

We need to set design optics ($\beta_{x^*} 4\text{ mm}$) and confirm small beam size.

We should perform experimental simulations of ILC beam tuning.

Continuous Run Schedule:

We discussed about continuous ATF2 operation for the Goal 1.

Two weeks from May 13 seems the best. However, schedule of others, such as installation of the new IP chamber, should be considered.

----- From P. Bambade -----

Concerning (3), it seems more vague to me, and could depend on the results of (1) and (2).

Also, I think we should have a clear "minimum goal for up to end of March", with the upcoming GDE review early April, and then some general goal or goals until the summer.

In particular, the continuous "goal 1 running" for two weeks in May should have some important milestone / specific goal associated to it. This will convince the overall team that is it not just another continuous run, but one during which something specific really *needs* to be achieved. In this way, it will be more attractive for people to join. I understand that there was some of this in the last December running.

In case we decide to install the new IP chamber between May and June, one could perhaps also include "IP stability" in the small spot goal 1 for May, using the existing hardware, as well as long term stability of the IP spot, to compare with expectations from simulations already made on the slow degradation of the spot size ?

But this will depend on the successes with (1) and (2). Some aspects may not be finished until March.

Another thing to convey to the collaboration is that training (complementary for some, and first time for newcomers) will continue to be done.

----- T. Tauchi -----

Comment on B.

The ATF DR is also a test facility for the ILC DR with respect to generation of low emittance beam. The vertical emittance is 2pm at the ILC DR whose beam energy is 5GeV. It is scaled to 7.7pm for the 1.3GeV at the ATF. So, further

emittance reduction (down to 4pm) is highly desired. It may provide the design emittance of 12pm even with the emittance growth at the extraction line.

Also, we could justify the emittance tuning procedure in the ILC TDR which is based on that developed at CEsrTA [J. P. Shanks et al., "Status of low emittance tuning at CEsrTA," Proc. PAC 11, New York, NY, 2011, pp. 1540-1542 (WEP022)] . However, according to M. Woodley, this tuning concept was abandoned when it was decided that we couldn't excite the beam in the DR resonantly during the storage. He suggested that such effort would strengthen a collaboration between ATF and CEsrTA if we can.
