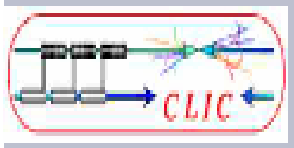

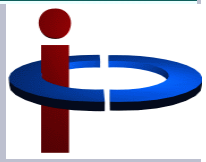


WP2 : Beam Delivery System

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2nd EuroTeV Annual Meeting, Daresbury

9th January 2007

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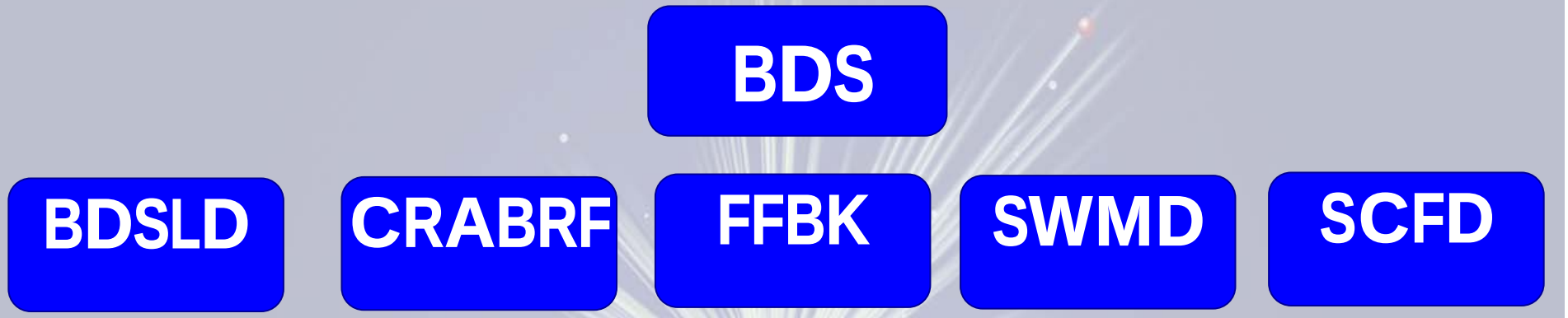

Several talks covering these tasks presented in details yesterday and today in BDS and BDS+ILPS+LET combined sessions and topical plenary.

BDSLD Highlights
CCLRC, CEA, UMAN

- **Final focus optimisation** : automatic procedure realising simultaneously the demagnification, the chromatic correction and aberration minimisation completed.
- **Small (0-2mrad) crossing angle design** : has become an alternative due to higher cost. For accelerator and physics motivations, studies to improve the designs continue.
- **Modified Head-on scheme** : modified final focus, electrostatic separator studies, SC final doublet and extraction line optics. Minimum extraction line under study.
- **2 mrad extraction line** : Optimisation of the IR region for 500 GeV and 1 TeV separately. Trying to ease complexity of magnet design. Minimum extraction line under study.
- **Collimation optimisation** : collimation performance has been improved by lattice modifications (for baseline ILC lattice).
- **Fringe field of the detector solenoid** : OPERA3D model has been developed.

BDSLD Highlights
CERN

• **Final focus optimisation** : development of algorithms for the optimisation of FFS. The FFS is optimised in three areas : non-linear aberrations, focussing and dispersion. After optimisations, total luminosity increased by 70%. Ongoing optimisations focus on the reduction of the length of the system and the simplification of the non-linear correction.

• **Collimation optimisation** : an alternative collimation system has been fully studied and characterised. The scheme benefits from the non-linear fields of skew sextupoles to reduce the energy density deposition at the collimator.

• **Use of tail folding octupoles** : to efficiently use octupole tail folding without affecting the luminosity, a new FFS design optics is required.

CRABRF Highlights
CCLRC, ULANC (CI)

- The development of a crab cavity is a critical requirement for the ILC 14 mrad crossing angle scheme.
- Strong collaboration with FNAL and SLAC on establishing crab system solution based on 3.9GHz FNAL CKM cavity.
- Basic design has been established but significant additional studies are needed for the optimisation.
- **Wakefields :** Evaluation of short and long range wakefields and prediction of instability thresholds have been progressed very well. A multi-cell prototype cavity has been manufactured to experimentally measure mode impedances with a stretched wire technique.
- **Phase synchronisation** : Critical issue. A scheme for synchronisation is under investigated at Daresbury and hardware will be assembled early 2008.

FFBK Highlights
Oxford (QMUL)

- A new generation of feedback system hardware has been designed, fabricated and tested.
  - **BPM processor** : the new design of the fast analogue front-end signal processor (reported last year) has been further refined and tested with beam at ATF.
  - **Digital feedback processor board** : design finalised and board fabricated in spring 06. Tested at ATF in April and June 06.
  - **Kicker driver power amplifier** : completely new design, suitable for the ILC like bunch trains at ATF made at Oxford. A prototype version has been developed and is being tested with beam in Dec 06.
  - **Feedback system operation** : after testing the elements of the feedback individually, the aim is to close the feedback loop and observe beam correction. First tests planned for spring 07.
- **Electromagnetic background tests** : a material model of the ILC extraction line was fabricated and deployed in ESA. July 06 run.

SWMD Highlights
CCLRC, Birmingham, UMAN, CERN, TUD

- **SLAC ESA wakefield tests** : Commissioning run January 06, two experimental runs April/May 06 and July 06.
- Comparison of measurements with analytic calculations and numerical modelling using GdfidL, MAFIA, ECHO.
- Progress has also made in setting up the RF bench tests at CCLRC and carrying out supporting simulations.
- Simulations of energy deposition and mechanical stress of spoiler jaw damage for ILC candidate betatron spoilers using FLUKA, EGS and ANSYS.
- Tests at ESA in 2007 will study wake field performance of such design together with copper jaws of same shape.
- **CLIC** : wakefields modelled using analytic approach. The module has been implemented in PLACET.
- A novel finite-difference time-domain numerical scheme for calculating wake fields of short bunches has been developed. A new scheme based on a new discretization method has also been developed.

SCFD Highlights
CEA

- The construction of 1m long superconducting quadrupole prototype with Nb3Sn is underway.
- Significant delays due to pole manufacturing problems. Five poles have been fabricated but only two are operational. Two more poles are presently being constructed.
- The test of the mechanical assembly of one cold mass with four short pieces has been done at ACCEL.
- The quadrupole assembly is foreseen in spring 07. High gradient tests in fall of 07.
- EuroTeV test of this quadrupole in an external field will take place in 2008.

BDS - Summary

- Several configuration changes in ILC BDS in last one year
- Lattice design optimisations continue for better collimation performance of the baseline
- Automatic final focus optimisation procedure completed
- 2 mrad crossing angle has become an alternative
- EuroTeV teams continue to complete small crossing angle design
- Mini workshop to discuss small crossing angle IR issues was held at Orsay,Saclay in October 06
- Regular task meetings/workshops with global participation
- Beam tests at ESA for collimation wake fields, background and feedback hardware tests at ATF successful this year
- Progress on Crab cavity simulations and experiments ongoing/planned for wakefields and phase synchronisation
- SCFD task is delayed and test in external field will be in 2008.
- Optimisation of non-linear collimation and final focus with improved performance for CLIC

LCWS06, EPAC06, EuroTeV reports