Tracking Review at Beijing

How we're organizing ourselves

SiD Advisory Meeting
December 11, 2006

Rich Partridge, Marcel Demarteau
for the Tracking Group

ILC Detector R&D Review

- Damerell panel will review tracking at Beijing GDE/ACFA meeting
- Sunday 4th Feb: **ILC Workshop, opening plenaries**
- Monday 5th Feb: ***Tracking Review*** - open session presentations, followed by dinner for all involved.
- Tuesday 6th Feb: ***Tracking Review*** - closed session discussions with individual groups
- Wednesday 7th Feb: **ILC Workshop, closing plenaries**
- Thursday 8th Feb: ***Tracking Review*** - closed session feedback of draft report to individual groups

- Tracking Review Committee (18 members, may have changed):
  - Panel members (Damerell, Karlen, Kim, Lohmann, Weerts)
  - RDB members (Elsen, Himel, Willis)
  - Consultants (Braun-Munzinger, Giomataris, Sauli, Hamagaki, Heijne, Sadrozinski, Spieler, Unno)
  - Two tracking organisers from Beijing workshop (Li Weiguo will select them)

Review

- Chris sent out a memo Nov. 30: “Guidelines for Participating Groups”; Follow-up memo on Dec. 8th
  - Collaborations should decide how they would like to present work
  - When bids are in, review committee will allocate time and make suggestions
  - Time allocation:
    - morning of 5th: gaseous tracking
      - LC-TPC two hours of presentations
      - 4th concept: one or two talks, to be negotiated with John Hauptman
    - afternoon of 5th: silicon tracking
      - SiLC two hours of presentation
      - SiD two hours of presentation
    - Additional groups outside these 4 collaborations will be given typically a 15 min talk

Presentation Format

- Any effort integrated with the SiD concept can be part of the two hours of presentation allocated to SiD
- We contacted all tracking efforts we know off
  - Brown U (Partridge) — part of SiD
  - U of Colorado (Wagner) — part of SiD
  - Kansas State, Bonn U (von Toerne) — no response yet
  - Purdue University (Bortoletto) — part of SiD
  - SLAC-Fermilab (Nelson, Cooper) — is SiD
  - University of Michigan (Riles) — part of SiD
  - UC Santa Cruz (Schumm) — part of SiD and SILC
  - University of New Mexico (Seidel) — part of SiD
  - UC Davis — no contact
- If we need more time we can negotiate for more time with Chris if need be
- Only response so far is that Bruce Schumm's chip effort is to be presented as part of SILC and SiD, and his software effort is part of SiD

Approach

- SiD specific part of the review
  - Address core SiD philosophy:
    - Emphasize uniform technology central and barrel region of SiD
      - SiD is unique in forward region
      - Need backup with tracking and benchmarking studies
    - Description of SiD performance and software development
    - Sensor R&D of double-metal layer with kPix chip readout
    - Module design
    - Barrel and forward disk design and mechanical support
    - robust against beam backgrounds
    - Emphasize that forward region needs R&D to optimize performance
    - Assumed that software development (Brown, Colorado, KSU) be integral part of this section of the presentation
  - Address core contributions from individual groups
    - Alignment system
    - Cable design
    - kPiX, bump bonding
    - Time over Threshold ?
    - Thin silicon ?
  - Suggested outline of presentations
    - Short introduction: 10 minutes
    - Overall SiD mechanical design: 40 minutes; suggested speaker Bill Cooper
    - Sensor and module design: 40 minutes; suggested speaker Tim Nelson
    - Overall performance, software, alignment, all the rest; 30 minutes

Report

- Damerell review panel would like a written report by Jan. 28
- Ideally the report should give an overview of the goals, starting from current status, up to the completion of their R&D programme, ready to start construction
- Scope indicated by panel (see next slide) is far too broad to be accomplished on such a short time scale
- Better strategy may be to start with SiD DOD or SiD section of DCR and highlight the R&D that is needed and give a solid estimate of the effort and M&S needed to complete the R&D
  - This could nicely fit in with the call for the 5-year R&D proposals by the ALCPG
- We're willing to help coordinate the effort for all the groups, but we need your feedback

Scope of Report

- Requested written report by Jan. 28
- Overview of the goals, starting from current status, up to the completion of their R&D programme, ready to start construction:
  - overall physics-driven performance goals
  - track-finding efficiency, down to what lower limit of polar angle and momentum
  - special case: tracks originating from *B* and *D* decays beyond the vertex detector
  - forward tracking - a weak area or not?
  - combination of difficult factors, such as long-lived decays, small polar angles, tracks in core of jets
  - momentum resolution vs momentum and polar angle over full range
  - *dE/dx* performance - how useful is this for physics?
  - design of sensors, modules, and support structures
  - readout electronics and DAQ system
  - system power dissipation, quantifying the benefits of pulsed power if used
  - cooling system
  - cabling and fibre optics - power and data
  - other infrastructure such as gas control systems
  - overall mechanical stability - implications of push-pull on calibration needs
  - vulnerability to errant beam bunches - 'fliers'
  - overall material budget; implications of secondary interactions and photon conversions on system performance such as jet energy resolution
  - other topics that lie in the cracks between tracking and other subsystems
- Report should discuss R&D program subdivided into work packages