

SiD Detector Optimization

The Road to the LOI

Andy White
SiD Advisory
June 23, 2008

We have set ourselves a **timetable towards the LOI**:

- > June - choose global parameters from current studies.
- > July - August - finalize sub-system optimization
- > September: optimized detector description ready for simulations for physics studies
- > Sept - Oct: generate simulated events for physics studies
- > Oct - Jan '09: Physics studies of LOI processes
- > Jan '09 - March '09: Write up results of studies

To achieve the successful completion of this schedule we need to address:

* Consensus on the outcome of present studies (SiD PFA, PANDORA/PFA, Ron's simulations, + Marty's cost studies,...)

We have many new results - a large number from "SiD-ish":
writing an SiD Note at this stage would test our understanding and reveal hole(s) in our arguments!

* Due to available computing resources, we have **limited statistics** -> need to run a small number of high(er) statistics jobs at chosen points to confirm behavior(s).

* Some choices of global parameters seem clear e.g. adding $+0.5\lambda$ to HCal depth, while others may have consequences that need study...

e.g. changing the aspect ratio of SiD by moving the start point of the end cap calorimetry out in z.

Longer detector in z-coordinate:

- may improve jet energy/di-jet mass resolutions in the forward directions (how much?)

- *but* -> stretching the vertex detector may have problems (deflections $\sim L^3$ (Bill Cooper)),

 - > effect(s) on MDI?

 - > will the detector still *fit*?

At least some engineering group evaluation/input is needed before we can agree to proceed with a longer detector.

 - > Cost?? Longer detector = more Si in tracker...

Subsystem optimization - within global parameter constraints.

- Need evaluation/statement from each subsystem - what must/can/should be optimized before we freeze subsystem description?

Benchmarking group - readiness for physics studies?

- Issues with running on results of perfect PFA??
- Can we test the whole software chain on a chosen physics process this summer - that would also serve as a check on results of global parameter optimization??

Issues:

- Readiness of SiD PFA for Fall
- Computing resources for final simulations.
- Organization of the physics studies
- ??