# Report from Large Detector workshop in Paris.

- Goals of workshop:
  - Set up detector concept study team, choose leadership.
  - Review detector technologies, R&D needs...
- Detector concept teams should:
  - Optimise performance against physics benchmarks.
  - Set requirements on sub-system R&D.
  - Interface with machine.
  - Produce integrated design.
  - Bring in new groups.
  - Prepare for LCWS, Snowmass, detector outline including costing, CDR...
  - Prepare ground for competitive proposals.
- Important to involve all three regions.
- “Large Detector” is essentially synthesis of TESLA TDR detector and American TPC based detector with 4T magnetic field.
- Other alternatives are:
  - “Small Detector” with silicon tracker (SiD) and 5T field.
  - “Huge Detector” with large TPC and 2..3T field.

# Report from Paris

- Progress towards goals:
  - Names will be sought for "Large Detector concept" leadership, two from each of Europe, America, Asia, by R-D Heuer, D Miller, Brau, M Oreglia, H Yamamoto, S Komamiya.
  - Reviews of detector technologies and state of R&D presented.
  - Discussions on requirements in detectors and possible physics benchmark reactions held.
- MDI workshop report (Steve W and Dave C were there!)
- Detector technologies:
- Vertex detector:
  - CCD, DEPFET, MAPS, FPCCD, FAPS, ISIS options under study.
  - Groups aiming to demonstrate function of full-scale ladders – timescale not yet clear.
  - Issues are readout speed, radiation hardness, minimising material budget, resistance to RF pickup...
  - Compare by designing realistic VXD based on each technology and performing full simulation of performance.

# Report from Paris

- TPC:
  - How to readout? GEM, Micromegas...
  - How to keep end walls $<<0.3X_0$?
  - Aim for 100 μm res. (x, y).
  - Res. in z ~ 3mm for 1m drift.
  - Optimisation of TPC length?
- Forward tracker etc.
  - Intermediate tracker 5 layers.
  - Forward tracker 4 layers.
  - Outer tracker 3 layers.
  - Optimise with calo. to identify conversions.
- Calorimeter:
  - Si/W for EM, shashlik or hybrid for hadronic section, but silicon costs decreasing. Complete calo. Si readout implies cost ~ $50M?
  - Hermeticity crucial.
  - Optimise (with TPC) for jet energy resolution.
  - Finer granularity in first layers?
  - Had calo. analogue or digital?
  - Coil in Had calo?
  - Scintillator and gas based digital calo.s behave differently.
  - Different simulation programs give different results.

# Report from Paris

- Reference quantities:
  - $\delta p/p$.
  - $\sigma_{IP}$.
  - $\delta E_{jet}/E_{jet}$.
  - e ID, $\mu$ ID, h ID.
  - low $\theta$ veto.
  - $E_{miss}$.
  - jet charge.
- Reference reactions ("VXD" only):
  - Higgs branching ratios
  - ee $\rightarrow$ HHZ.
  - $A_{FB}$ in ee $\rightarrow b\bar{b}$.
- Some comments:
  - People want to see influence on physics measurement of increase of beam pipe radius.
  - Must continue to demonstrate importance of minimising material budget.
  - Need to start thinking seriously about Lorentz angle effects in CPCCD.