ILC and Indian HEP community

• First link at the 1st ACFA Workshop on Physics/Detector at the LC, Tsinghua University, Beijing, on Nov 26-27, 1998.

• Indian community met at Dec, 1998 at Chandigarh (DAE symposium) to discuss possible participation in physics and detector
  – Indian physicist became member of LHC-LC interdependence study group, international advisory committee, world wide study group from Asia

Prof. Atul Gurtu, ex-TIFR
Prof. Rohini Godbole, IISc
ILC and Indian HEP community

- April 2003: India-ACFA Meeting on Linear Collider at CAT, Indore
- November 2013: India-US International meeting on Linear collider at Delhi
- December 2003: The 6th ACFA Workshop on Physics & Detector for Linear collider at TIFR
- April 2004: Moderate participations in LCWS04 at Paris
- “August 20 (or so): Tariq Aziz (BELLE expt) received an e-mail from BELLE spokesperson (Prof Yamauchi) mentioning that India should try to send a representative to attend the FALC (Funding Agencies for Linear Collider) meeting scheduled at CERN on 16-17 Sept 2004. ….. AG attended FALC meeting”. R. Godbole continue to attend it till 2016.
ILC and Indian HEP community

- **October 2004**: Discussion on Indian Participation in ILC ILCWG meeting, IISc Bangalore
- **March 2006**: LCWS06 at IISc, Bengaluru
- Regular participation in LCWS, ACFA, member of organising committee at TILC08, LCWS08, TILC09,
  - Regular representation on the IAC of LCWS
  - International Detector Advisory Group (IDAG)
  - Funding Agencies for Large Colliders (FALC)
- **Had moderate funds till 2016 to attend/organise ILC related meeting**
Theory/Pheno activities

- Effects of Bremsstrahlung on the physics possibilities at a Linear Collider
- Two photon physics at linear collider
- Probing BSM physics through the Invisible Higgs decays at $e^+e^-$ colliders
- Higgs studies in particular anomalous Higgs vertices in the gauge boson sector and top/tau sector
- Aspects of anom. vertices involving gauge bosons (both at $e^+e^-$ and photon photon colliders)
- Study of CP property of the Higgs boson through couplings with W/Z/t and tau (both at $e^+e^-$ and photon photon colliders)
- Higgs study in the Higgs effective field theory at $e^+e^-$ colliders
- ED possibilities at $e^+e^-$ and photon photon colliders

From more than 30 people
DAE DST vision meeting 2006

• The community recommends two experimental activities, one international collaboration in an accelerator laboratory abroad and the other being an India based activity. The general consensus reached in the High Energy Physics community is to endorse

• International Linear Collider (ILC) with a strong physics program derived over the last 15 years to be the next generation accelerator based program in which Indian High Energy Physics community should participate actively, and

• India-based Neutrino Observatory (INO) with a rich physics potential during its first phase of operation with atmospheric neutrinos to be the major domestic HE Physics activity in coming years.

• It is strongly felt that both these activities should be pursued at all levels – by the phenomenologists, experimentalists and accelerator physicists. A common platform should be built for each of these activities and physicists and engineers belonging to these disciplines will collaborate and contribute to these projects.
Recommendation from DAE DST vision meeting 2014

- The need of the time is to form a Future Colliders Forum at all India level just like the ILC-India Forum. Collaborations on the phenomenological front with the International Community as well as on the accelerator and detector front are where Indian community is all geared up for now.
Plan for calorimetric R&D towards ILC physics

Thrust area on the ILC calorimeter R&D

• Optimise tile size/thickness, both in ECAL and HCAL
• Software for better particle flow algorithm
• Analog/Digital/semi-analog hadron calorimeter

Plan to contribute on these issues by

• Associate with GLD beamtest at CERN / KEK/ FNAL
  – Predict better detector performance in GEANT4 simulation
  – Make detector module for test beam, test basic properties with cosmic muon
  – Analyse test beam data and compare with Geant4 for further improvement
• Developed software for better Particle Flow Algorithm
• Analysis of simulated physics events for a better detector design
• Finally build a part of calorimeter for the ILC and do data analysis for discoveries and precision tests

10th Oct, 2006 : Visit of Prof. Atsuto Suzuki, KEK director at TIFR

“Prof Tohru Takeshita sent SiPM to start testing different coupling of SiPM with scintillator”
Simulation efforts, mainly collaboration with Akia Miyamoto, KEK

Jupitar software: $e^+e^- \rightarrow ZZ$ events

- The Z-pole events were used for the PFA performance check.

Red: Pion
Yellow: Gamma
Blue: Neutron
More

• 12:15 : Accelerator R&D in India and partnership in international accelerator projects
  – Speaker: P. Srivastava, RRCAT

• 14:15 : Detector R&D in India
  – Speaker: A. Topkar