Strawman Proposal plus R&D Efforts and Priorities

IPBI Parallel Session
Santa Cruz Linear Collider Retreat
June 28th, 2002
UC Santa Cruz

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• Beam Energy
• Beam Polarization
• Luminosity

Needs + Proposals + Topics
Energy Needs

- Target 200 ppm from $2m_t < \sqrt{s} < 1\, TeV$

  $\Delta m_t, \Delta m_H \sim 50\, MeV$

- Recognize desire for 50 ppm at $2m_W$ ...

Energy Proposal

- BPM-style at upstream 1mRad bend
  RT monitor, possible absolute scale

- WISRD-style at post-IP chicane
  RT monitor, possible absolute scale

  Energy width?

- Forward tracking 200-500 mRad
  Lumi-weighted absolute scale

⇒ Also, machine diagnostics for width ...
Spectrometer

- WISRD detailed design (new detectors)
- BPM detailed design (RF BPM technology)

U.Mass, Oregon, Notre Dame, Berkeley

Physics Studies

- Radiative Returns $\mu\mu\gamma$
- Boson Pairs $WW, ZZ$

Kansas, Oregon, ???

Detector Issues

⇒ Forward Tracking (~200 mRad)

UCSC, ???
Polarization Needs

• Target $\frac{\delta P}{P} = 0.25\%$ per beam
  SM, SUSY, other asymmetries

• Recognize desire for $\frac{\delta P_{eff}}{P_{eff}} = 0.1\%$
  ⇒ Positron Polarization

Polarization Proposal

• Compton polarimeter at post-IP chicane
  RT Monitor, depolarization effects

• 2-5\% pulse stealing for undisrupted beams
  Absolute polarization scale

• WW (t-channel) asymmetry
  Lumi-weighted polarization
  ⇒ Forward tracking...
Compton Polarimeter

- Beamline design and layout
- Cherenkov detector design
- Photon detector design
- Upstream detector?

SLAC, Tennessee

Spin Transport

- Spin diffusion
- Machine transport
- Beam-beam depolarization

SLAC

Physics Issues

- WW Polarimetry
- Polarization-Energy-Luminosity correlations

???

⇒ Also $P_+$ demo and instrumentation ...
Many Unanswered Questions

(At least in my mind...)

- Absolute Lumi needed? To what precision?
- LEP-style Bhabha monitor useful/optimal?
- Real $dL/dE$ tolerances known?
  Tails vs. Core (Linac) shape?
- Any real proposal for RT lumi monitoring?
  Radiative Bhabha?

Following Lumi section is more speculative...
Luminosity Needs

- Target $dL/dE$ precision at 1%
- Target relative $L$ precision at ??%

Threshold Scans

- Recognize desire for absolute $L < 1\%$

Hadronic cross-section

Luminosity Proposal

- Bhabha tagger at low angles

Absolute/relative lumi, $dL/dE$?

- Forward tracking 200-500 mRad

$dl/dE$ measurement

- Pair monitor in forward direction

RT monitor, Beam diagnostics, relative $L$

- BSL beam diagnostic monitor
- Radiative Bhabha monitor
Physics Studies

- $m_t, m_H$, ? dependence on core width and tails
- Acolinearity analysis demonstration
- Calorimeter-based $dL/dE$ methods?
- Absolute/relative lumi requirements

Wayne State, Tokyo, Physics Groups?

Detector Issues

- Forward tracking
- Bhabha monitor
- Pair monitor
- Radiative Bhabha?

UCSC, UCL, ???

Machine Issues

- BSL monitors
- Fast RT Lumi for tuning?

Wayne State, ???