Strawman Proposal plus R&D Efforts and Priorities

IPBI Parallel Session
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UC Santa Cruz

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- Beam Energy
- Beam Polarization
- Luminosity

Needs + Proposals + Topics

Beam Energy Proposal

Energy Needs

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

$$\Delta m_t, \Delta m_H \sim 50 \text{ MeV}$$

- 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 ...

Beam Energy R&D List

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 Proposal

Polarization Needs

- Target $\delta P/P = 0.25\%$ per beam

  SM, SUSY, other asymmetries

- Recognize desire for $\delta P_{eff}/P_{eff} = 0.1\%$

  ⇛ 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...

Polarization R&D List

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 ...

An Aside on Lumi Questions

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 Proposal

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

Luminosity R&D List

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, ???