Summary Talk
Detector Integration / MDI / Polarization

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DESY - FLC

LCWS 2012, Arlington, TX, USA

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Discussion topics

- **Alignment, vibration, earthquakes/ground motion & correction, MDI, ILC site**
  K. Büsser, M. Oriunno, K. Riles, P. Burrows, A. Jeremie, Y. Renier, F. Ramos
- **Polarization & collision effects**
  A. Rosca, G. Wilson, B. Bilki, A. Hartin, M. Beckmann
- **Luminosity measurement & radiation hardness**
  W. Lohmann, B. Schumm
- **Final focus systems, Solenoid & luminosity optimization**
  O. Garcia, H. Morales, Y. Levinsen, L. Malysheva, M. Modena, C. Collette
- **Cryogenics**
  T. Okamura

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MDI & ILC site: Propective Japanese ILC Sites

Talks by Karsten Büsser (DESY), Marco Oriunno (SLAC)

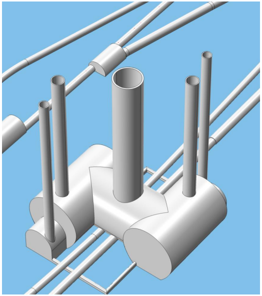
ILC Mountain Site

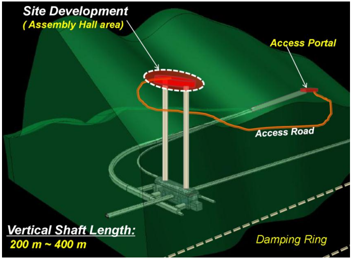
MDI & ILC site: Access Shafts

Assembly Procedures for different Sites

SLAC

- The assembly procedure will be different for the two sites
- Both layouts must satisfy push-pull requirements
- The detector hall must be optimized for costs: benefits vs. features





•Vertical shafts (Europe, Americas)

•Horizontal shafts (Japan)

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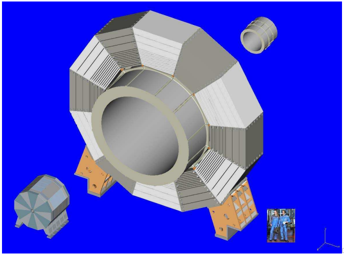
Coil Installation

- In case of mountain sites:
  - Coil can only be transported without its ancillaries (cold box, chimney)
  - Functional test needs to be done underground after installation into central barrel yoke ring
    - very low fields, yoke will not be ready by then
    - Takes >3 months (incl. cool-down and warm-up)
- Test of field mapping equipment is needed at the same time
  - ALEPH experience



R. Stromhagen

MDI & ILC site: Key Message

- Mountains complicate things
- Need more time and preparation
- No fundamental problem

Earthquakes

Talk by Fernando Duarte Ramos (CERN)

Seismic isolation strategies

Four seismic isolation strategies:

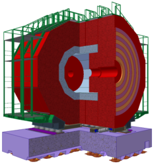
- Rigid detector support;
- Isolation under platform;
  - Using airpads;
  - Using friction pendulum isolators;
- Isolation above platform;

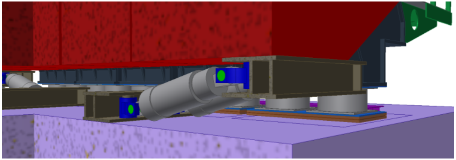
Earthquake protection for Linear Collider detectors – LCWS12, Arlington, USA | 7

Earthquakes

Energy dissipation

- 8 dampers connect the closed detector to the platform;
- Mechanical “fuse” provides rigidity under normal operating conditions;
- Removal upon opening of detector;





Earthquakes

- Earthquakes in Japan bigger issue than at CERN
- Measures constrained by cavern design and available space
- Detector design must follow safety regulations
- People's safety during operation and construction important

Beam-Beam Effects

Talk by Anthony Hartin (DESY)

IP depolarisation

Spin precession

Beam field strengths — Spin vector

$$\frac{d\boldsymbol{s}}{dt} = -\left[(a+\gamma^{-1})(\boldsymbol{B}-\boldsymbol{v}\times\boldsymbol{E}) - \boldsymbol{v}\frac{a\gamma}{\gamma+1}\boldsymbol{v}\cdot\boldsymbol{B}\right]\times\boldsymbol{s}$$

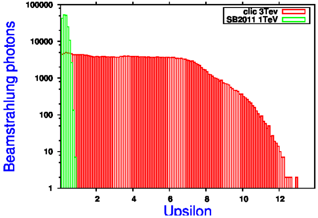
Anomalous magnetic moment in external field

Spin-flip process

Constant crossed field – Airy functions — Spin vector

$$W(\Upsilon,\boldsymbol{\xi}) = \frac{\alpha m_e^2}{\pi\epsilon}\int_0^\infty \frac{du}{(1+u)^3}\left[\frac{e}{m^3}F^{*\mu\nu}p_\mu s_\nu \frac{z\mathrm{Ai}(z)}{1+u} - \mathrm{Ai}_1(z) - \frac{2+2u+u^2}{z\,(1+u)}\mathrm{Ai}'(z)\right]$$

beam field tensor



Parameter	ILC 1TeV	CLIC 3 TeV
$\mathcal{L}(\times 10^{34})$	4	3.6
N(incoh)	3.9e5	3.8e5
N(coh)	0	6.8e8
Υ (ave)	0.27	3.34
Υ (max)	0.94	10.9
δE_{bs}	10%	28%
$\langle$depol$\rangle_{LW}$	0.62%	3.5%

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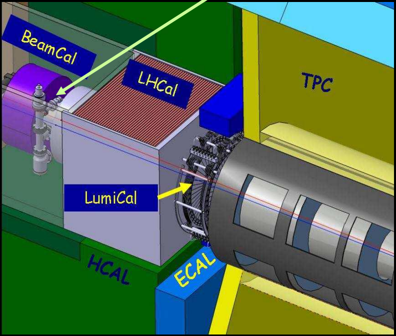
Radiation vs. Forward Region Instruments

Talk by Bruce Andrew Schumm (UC Santa Cruz)

The Issue: ILC BeamCal Radiation Exposure



ILC BeamCal:

Covers between 5 and 40 miliradians

Radiation doses up to 100 MRad per year

Radiation initiated by electromagnetic particles (most extant studies for hadron – induced)

EM particles do little damage; might damage be come from small hadronic component of shower?

Outlook

Long list of open issues:

- Details of machine-detector integration, platform design
- Surface assembly facilities
- Utilities in mountain site (electricity, water etc.)
- Many more...

Thanks to all speakers

and

thanks for your attention!