Report of Sendai (Tohoku) GDE meeting

20080310 T. Omori

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Sendai GDE Program

http://www.awa.tohoku.ac.jp/TILC08/

- Mar/3rd(Mon)
  - am: ACFA+GDE Plenary
  - pm: GDE Plenary
  - Reception
- 4th(Tue) Parallel
- 5th(Wed) Parallel
- 6th(Thu) Plenary
  - am: GDE Plenary
  - pm (14:00-15:45) : ACFA+GDE Plenary

4 Working Groups

- WG-1 Cost Reduction Studies
- WG-2 SRF
- WG-3 BDS / MDI (including ATF2)
- WG-4 DR (including ATF)
  - Omori gave a talk here. (2-mirror cavity and 4-mirror cavity, evening 4th)

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Navigating the Bumpy Road to the ILC

Barry Barish

GDE Workshop - Sendai

3-March-08

TDP I -- 2010

- Technical risk reduction:
  - **Gradient**
    - Results based on re-processed cavities
    - Reduced number 540 → 351 (reduced US program)
  - **Electron Cloud (CesrTA)**
- Cost risks (reductions) – Main Cost Drivers
  - **Conventional Facilities (water, hall sizes, etc)**
  - **Main Linac Technology**
- Technical progress (global design)
  - **Cryomodule baseline design is a being developed (e.g. plug compatible parts)**

TDP II - 2012

- RF unit test – 3 CM + beam (KEK)
- Complete the technical design and R&D needed for project proposal (exceptions*)
  - **Documented design**
  - **Complete and reliable cost roll up**
- Project plan developed by consensus
  - **Cryomodule Global Manufacturing Scenario**
  - **Siting Plan or Process**

TDP II 2012
what won't be done?

- Detailed Engineering Design (final engineering, drawings, industry, etc) will follow before construction.
- Global CM industrial plant construction
- Some other unresolved issues
  - **Positron Source ???** ← arrow by TO
  - **Damping Ring Design work?**

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WG-1: Cost Reduction Studies

J. Carwardine, T. Shidara, N. Walker
(For WG-1 participants)

Process for WG-1

- Look for ways to reduce the cost
  - **More than walking through each line of the cost estimate.**

- Started with >100 suggestions from various sources
  - **Wide range of suggestions, topic areas, and scope.**
  - **Too many for this group to evaluate quantitatively.**
  - **Many ideas not new.**

arrow by TO

- Different ways to group the ideas, eg:
  - **By technical area, technical system**
  - **By topic, eg engineering integration, lattices, staging, operating margins.**

- Four sub-groups individually considered the full list, identified their ‘top 10’ for further consideration

arrow by TO

Some themes from Top-10 lists

- Civil, siting:
  - **Single tunnel, shallow site,..**
  - **Underground space utilization**

- Accelerator
  - **Positron source**  arrow by TO
  - **DR short-bunch design, eliminate BC2**

- Engineering
  - **HLRF: Marx, no circulators,…**
  - **Magnet stringing, power supply**
  - **Increase cooling water delta-T**

Next steps

- Follow through on the 'Top-10' items from this meeting
  - **Several items need more thorough evaluation for feasibility, cost savings, risk, etc**
  - **Several items are already on the list and we need to get people working on them.**

- Continue to solicit and evaluate new proposals.
  - **Maintain an active list of possible cost reductions.**
  - **Distribute the outcomes from this meeting.**

- Specific items for further study
  - **Civil/siting: major theme of Dubna GDE meeting**
  - **Positron source integration study.**  arrow by TO
  - **Technical systems impact of high cooling delta T.**
  - **Magnet power supply stringing and space utilization.**

Omori made a question

Could you please explain a little bit more about "Positron source integration study" ?

John Carwardine-san's answer

This means revisit to the undulator-conventional comparison

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BDS way forward
summary for GDE-BDS

Andrei Seryi, SLAC

Thanks to all participants of GDE-BDS and ACFA-MDI sessions
and to the BDS design team

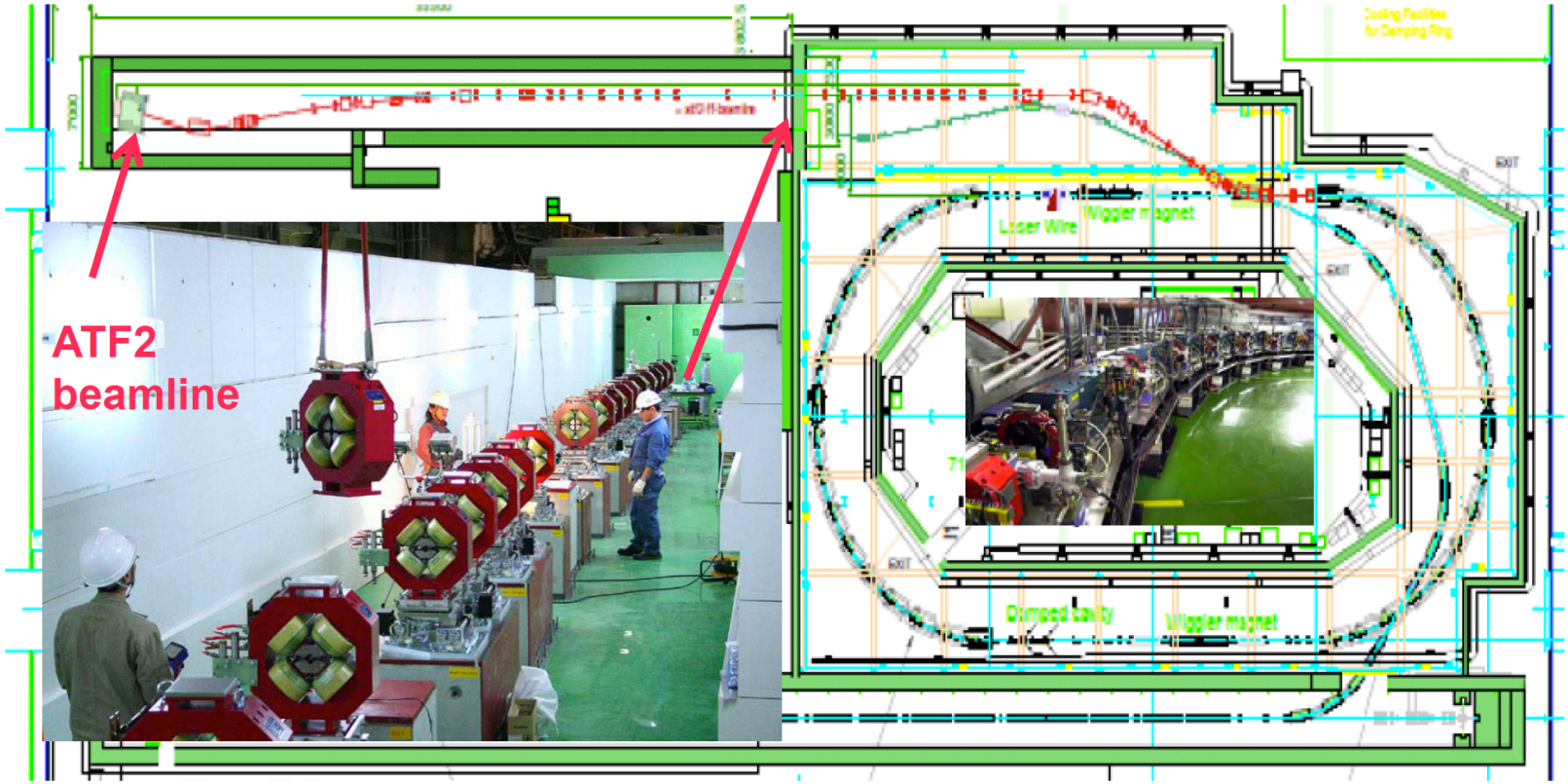
TILC08, March 6, 2008, Sendai, Japan

BDS planning strategy

- Do not proceed with:
  - **Design, or engineering of near-standard systems (e.g. beamline vacuum or magnets), or detailed consideration of requirements for CFS**
- Do focus on:
  - **Science, with emphasis on advanced ideas, which promise breakthroughs in performance/cost, reaching higher E, reduction of length, e.g.:**
    - BDS for CLIC, $\gamma\gamma$ design & system tests, crystal collimation, …
  - **Critical areas of design**
    - IR & detector integration, FD, ATF2, …
  - **Areas where new collaborators are joining**
    - Recent work at SLAC with BARC, India, on beam dump design
- Explore synergies
  - **LHC crab cavity design, …**
- Expect to revise strategy:
  - **When LHC results will allow determining the specific configuration of ILC**

arrow by TO

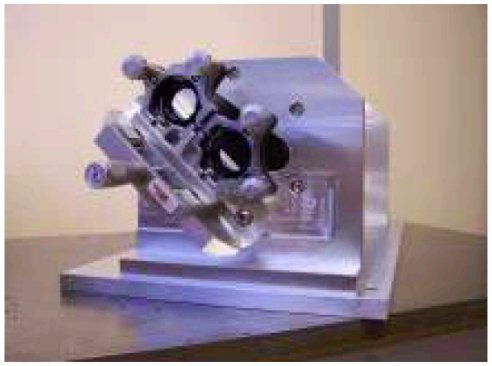
ATF2: Beam delivery model

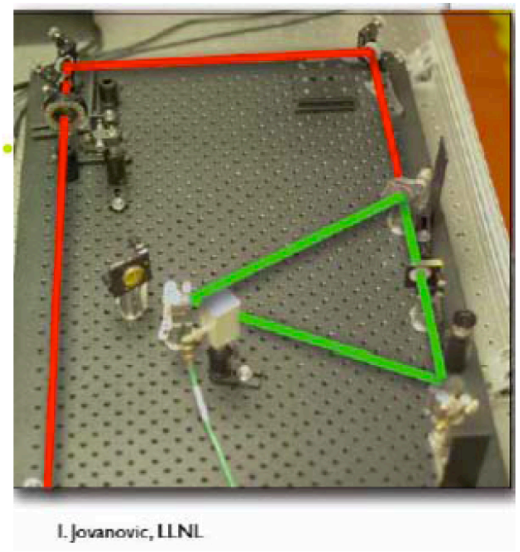


Built for ILC. Advanced accelerator study and beam handling applicable to any single path beamlines such as LCLS, XFEL.

ATF collaboration: >200 scientists. ATF MOU: 20 institutions worldwide

Options for e→γ cavity





Pulse Stacking Cavity
(R&D for Positron source KEK-LAL-Hiroshima-Waseda-Kyoto-IHEP)

enhancement: 300-1000
tight motion tolerances

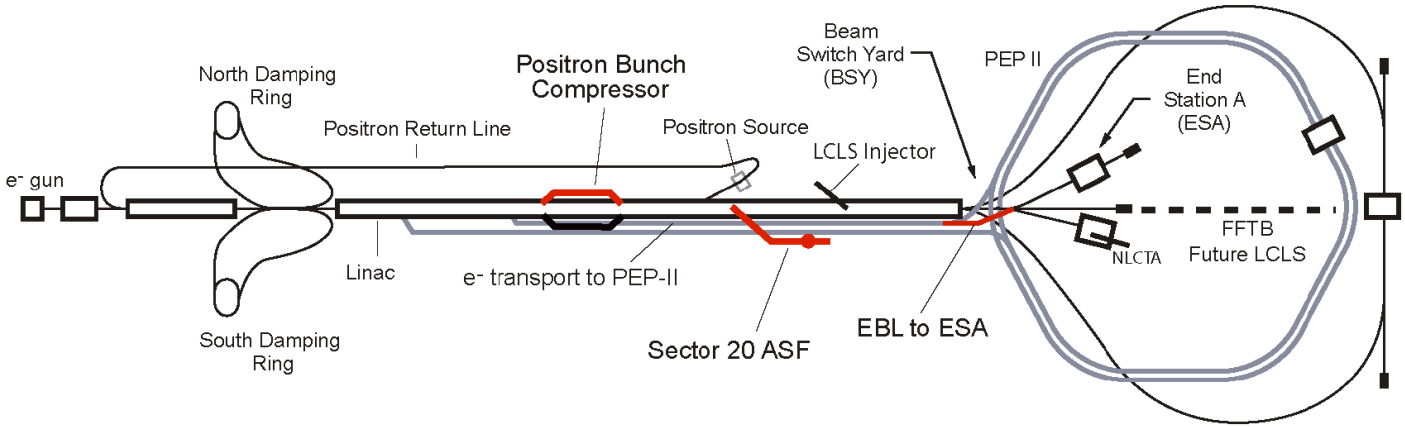
RING (Recirculation Injection by Nonlinear Gating) Cavity LLNL

recirculation of a pulse ~50 times
compensation of circulated pulse decay

- Developing R&D plan for e→γ considering ATF2 and FACET (ESA) for the system test

T.Takahashi, et al

BDS & MDI at FACET



- Proposed FACET includes ESA area primarily dedicated for BDS/MDI subsystem tests
  - **Energy spectrometers and collimation system tests**
  - **Beam diagnostics**
  - **Detector component studies**
  - **System test of e=>γ conversion for γγ option** ← arrow by TO
  - **Study forward region detector and GAMCAL …**

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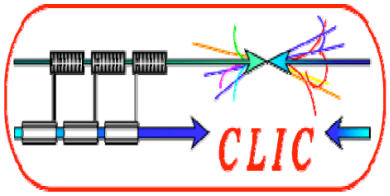
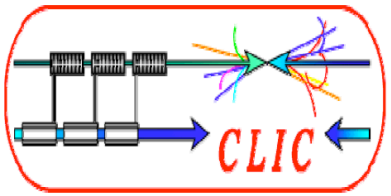


CLIC-ILC Collaboration?

- **Following visit of Barry @ CERN (Nov 07)**
  http://www.linearcollider.org/newsline/archive/2007/20071213.html

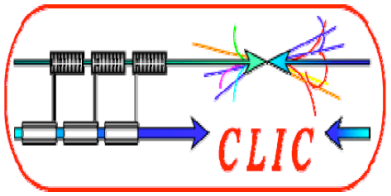
Independently of US/UK financial crisis,

but even more desirable now



Subjects with strong synergy

1. **Civil Engineering and Conventional Facilities**
2. **Beam Delivery Systems & Machine Detectors Interface**
3. **Detectors**
4. **Cost and Schedule**
5. **Beam Dynamics & Beam Simulations including Low Emittance Transport**



Other subjects

- **Positron generation based on Compton Scattering**
- **Damping Rings,**
- **Klystrons (L band) & Modulators with long pulses and high efficiency**
- **High power beam dumps**
- **Operational & reliability issues**
- **Machine Protection System**
- **Others?**

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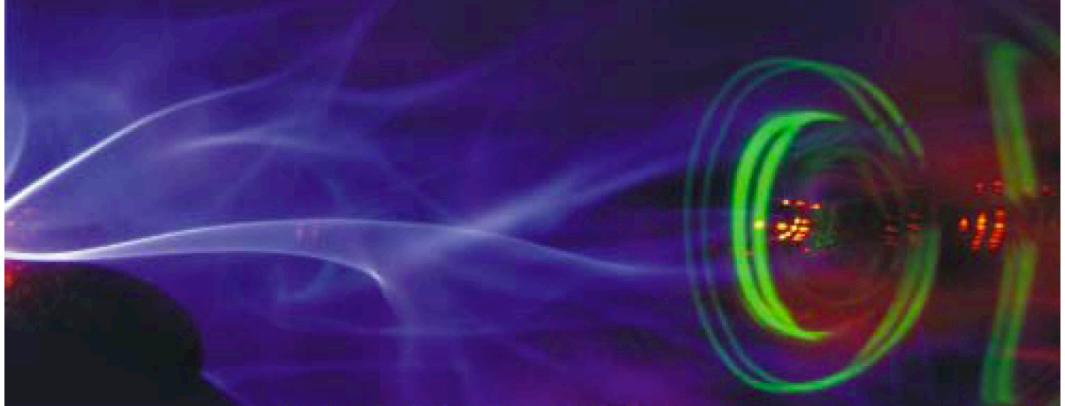
GDE Meeting

ILC Conventional Facilities and Siting Workshop



June 3 - 7, 2008

JINR, Dubna, RUSSIA

Program Committee

Barry Barish
Mike Harrison
Brian Foster
Mitsuaki Nozaki
Ewan Paterson
Marc Ross
Grigory Shirkov
Alexey Sissakian
Nicolas Walker
Akira Yamamoto
Kaoru Yokoya

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Local Organizing Committee:

Sissakian A. - chairman
Shirkov G. - co chairman
Trubnikov G. - scientific secretary
Kekelidze V. - coordinator
Kuznetsova E. - secretary
Rudagov Ju.
Meshkov I.
Tokareva N.
Shirkova E.
Holiakova Yu.

Site Studies

- (Also a cost-reduction study)

- Shallow site
  - **Cut and cover + klystron gallery**
  - **Shallow tunnel + klystron gallery**

- Single-tunnel (XFEL-like) options
  - **An engineered / construction solution**
  - **We get this (almost) for free.**

- Focus of JINR (Dubna) GDE Meeting (06.08)
  - **JINR shallow-site studies**
  - **CERN (CLIC-ILC) collaboration**

Formally part of ILC-HIGRADE (European) programme

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Summary

1. e+ source is still the '???' item in the GDE management.
2. Cost reduction may require further studies in a comparison of undulator- and conventional-sources.
3. Synergy is considered more important in GDE recently, in the context of the advanced accelerator technologies. The Compton is one of examples.
4. CLIC-ILC collaboration may include Compton.
5. Supports to the Compton source are increasing.
6. In the next GDE meeting at Dubna (June 3-7), GDE will focus on Siting and Conventional Facilities. Therefore, probably there will be no e+ discussion in Dubna. But we have to continue watching carefully.