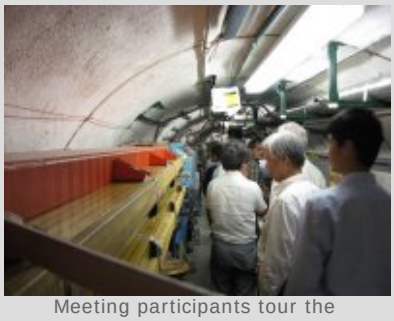
Around the World

Damping starts this week

CesrTA kick-off meeting marks the beginning of the damping ring test programme



Meeting participants tour the transforming CESR ring.

There may not have been a ribbon-cutting ceremony or speeches by heads of state. But the official kick-off of Cornell University's CESR storage ring as ILC damping ring test facility pleased the nearly 40 participants at this week's "Joint CesrTA Kickoff Meeting and ILC Damping Rings R&D Workshop (ILCDR08)" enormously. “CesrTA will give us a detailed picture of the how electron cloud builds up under a range of conditions, of how an ultra-low emittance positron beam interacts with the electron cloud, and of how beam instabilities driven by the electron cloud develop,” says Andy Wolski, damping ring group leader based at the Cockcroft Institute in the UK. “In this respect CesrTA plays a critical role in validating the decision to reduce costs by eliminating the second positron damping ring.”
Read more...

-- Barbara Warmbein

Calendar

Feature Story

Rolf Heuer's vision of particle physics in Europe

Rolf Heuer giving a personal view of the future at last ILC-ECFA Workshop in Warsaw. Photo: Nobu Toge.

The future Director-General of CERN Rolf Heuer, currently Research Director at DESY, presented his personal vision of the future of particle physics in Europe at the ILC-ECFA meeting in Warsaw, Poland. Heuer emphasised the exciting times the community is now entering with the LHC start-up. The exploration of our mysterious "Dark Universe" is the main motivation for present and future astronomy and particle physics projects, and with the LHC and its highest collision energy ever, we are on the verge to explore it. After reviewing many possible scenarios and options for the after-LHC phase, Heuer said he hoped that particle physics research will continue with the same momentum for future projects, in particular for a future e^+-e^- collider. He hopes that the community will make use of these exciting times to establish a sustainable and global partnership between the labs, "of which CERN could be the catalyst."
Read the full interview with Rolf Heuer...

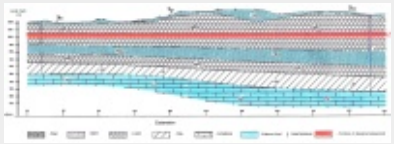
-- Perrine Royole-Degieux

link to ECFA 2008 talk

In the News

Director's Corner

The proposed Russian ILC site



Profile of the shallow site near Dubna, Russia.

One of the most difficult and tricky issues for the Global Design Effort in carrying out our design work is how to approach the siting issue for the ILC before proposals are actually solicited for hosting the machine. Conventional facilities are a major part of the project, accounting for almost one third of the total costs. Therefore, in order to bring as much reality to our reference design as possible, we asked for and studied three "sample sites," one from each region. In carrying out the reference design, regional subgroups that worked in parallel and were coordinated by our Conversional Facilities and Siting (CFS) group studied these sites. Since all three of our sample sites were deep sites about 100 metres underground, one of the questions that we postponed but flagged as important to study in the next phase were the comparative advantages and disadvantages of shallow sites. One specific example of a shallow site has been suggested to us by our Russian collaborators. We got a first look at this interesting site near Dubna, Russia, during our GDE meeting last month.
Read more...

-- Barry Barish

Director's Corner Archive

Announcements

Upcoming meetings, conferences, workshops

Joint CesrTA Kickoff Meeting and ILC Damping Rings R&D Workshop (ILCDR08)
Cornell University, USA
8-11 July 2008

34th International Conference on High Energy Physics (ICHEP'08)
Philadelphia, USA
29 July - 5 August 2008

Conference on the Design/ Optimization of the Silicon Detector at the International Linear Collider
University of Colorado at Boulder, Colorado, USA
17-19 September 2008

Upcoming school

Third International Accelerator School for Linear Colliders (2008 LC School)
Oak Brook, Illinois, USA
19-29 October 2008

= Collaboration-wide Meetings

GDE Meetings calendar

View complete ILC calendar

From *Nature*
8 July 2008
Spending plan appeases UK physicists
...The council will still forgo participation in the International Linear Collider, for example, but will set aside £1 million pounds for research and development into something similar, and £10 million a year for advanced accelerators.
Read more...

From *The Herald News*
6 July 2008
Fermilab celebrates its good fortune
If the sign declaring "Fermilab is back!" didn't get the message across, the auditorium packed with lab employees sure did.
Read more...

From *Le Monde*
4 July 2008
Deux collisionneurs sont déjà à l'étude pour succéder au LHC vers 2025
...Ils savent en effet que le LHC ne suffira pas à percer tous les secrets de la matière. Si, par chance, le mystérieux boson de Higgs, dont la théorie prédit qu'il donne leur masse aux choses, y est découvert, un instrument plus performant sera nécessaire pour connaître ses propriétés. Deux projets concurrents sont à l'étude : le Collisionneur linéaire international (ILC) et le Collisionneur linéaire compact (CLIC).
Read more...

From *Pour la science*
July 2008
L'ILC, collisionneur de prochaine génération
Après le grand accélérateur circulaire du LHC au CERN, sur le point de fonctionner, les physiciens des particules ont prévu de construire une machine plus puissante encore. Elle sera linéaire.
Read more...

From *Physics World*
3 July 2008
UK physics funding plans are approved
...This includes UK involvement with the International Linear Collider (ILC) — the next big particle-physics facility after CERN's Large Hadron Collider.
Read more...

国际直线对撞机
Ni hao ! The translated version of *The International Linear Collider - Gateway to the Quantum Universe* has just come out in Chinese. More languages will follow. Order your Chinese copy here.

arXiv preprints
0807.1188
A 4th generation scenario

0807.0669
Complete one-loop electroweak corrections to *ZZZ* production at the ILC

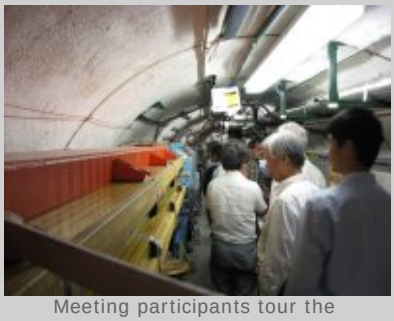
0807.0663
The Triple Higgs Boson Self-Coupling at Future Linear e^+e^- Colliders Energies: ILC and CLIC

Damping starts this week

CesrTA kick-off meeting marks the beginning of the damping ring test programme

There may not have been a ribbon-cutting ceremony or speeches by heads of state. But the official kick-off of Cornell University's CESR storage ring as ILC damping ring test facility pleased the nearly 40 participants at this week's "Joint CesrTA Kickoff Meeting and ILC Damping Rings R&D Workshop (ILCDR08)" enormously. “CesrTA will give us a detailed picture of the how electron cloud builds up under a range of conditions, of how an ultra-low emittance positron beam interacts with the electron cloud, and of how beam instabilities driven by the electron cloud develop,” says Andy Wolski, damping ring group leader based at the Cockcroft Institute in the UK. “In this respect CesrTA plays a critical role in validating the decision to reduce costs by eliminating the second positron damping ring.”

After a long, successful run with its CLEO detector, Cornell's Electron Storage Ring CESR shut down in spring this year as a high-energy physics machine. It continues its life as a synchrotron source, CHESS, and test accelerator for the ILC damping rings. Damping rings compact the electron and positron bunches to yield the high density needed to produce the targeted number of collisions inside the detectors. Some reconfigurations had to be made to make sure CESR-into-CesrTA meets the requirements and provides the damping ring experts with the data they need. One of the effects that they try to get rid of from the very beginning is the feared electron cloud. CesrTA is a great study object because of its many wigglers that will help them understand electron cloud build-up within the wigglers' strong magnetic field. It also shows them the effect an electron cloud has on a beam with very low emittance, i.e. a very small and homogenous beam.



Meeting participants tour the transforming CESR ring.

Some changes have to be made to the machine that runs underneath a playing field on the Cornell campus. A new lattice optics, for example, is being put in place for low horizontal emittance, a couple of wigglers have to be moved around the ring and the central part of the CLEO detector has to make way for more wigglers. On top of that, the team is installing additional instrumentation that lets them measure the electron cloud directly, check beam sizes extremely fast and with micron resolution, and control the beam. Along the ring, a new survey system is being installed to align all components to the accuracy needed for ultra-low vertical emittance.

“Achieving all these changes on a limited timescale and with limited budget has been no mean feat,” says Wolski, also congratulating his Cornell colleagues on their idea to modify their machine “and for steering the proposal through a demanding approval process in a particularly difficult funding climate. They managed to adapt the programme to meet resource restrictions while retaining the essential value of the programme and build a strong international collaboration.”

The collaboration also plans comprehensive tests of a range of techniques that they hope can stop the feared cloud from forming in the first place. They look at coatings with materials that have low secondary electron yield, meaning that any starting cloud would not be able to knock electrons out of the material so easily, and grooved chamber surfaces. This will help them find the best possible design of the vacuum system for the damping rings. The results will be collected in stages over the next two years.

Project Manager Marc Ross appreciates the efficient interplay between scientific goals, the availability of the test facility and funds to support the GDE's plan of work there: “CesrTA fills a unique role as a dedicated test facility not only because it has positrons, but also because it has many superconducting wigglers, more than any other storage ring. The strong team and flexible well characterised infrastructure are also quite important,” he says.

The meeting ends on Friday and you can follow the sessions by Webex. Click here for instructions.

-- Barbara Warmbein

This is part two of a series on how a storage ring at Cornell University morphs into a damping ring.
Read the first part here: http://www.linearcollider.org/newsline/readmore_20080529_ftr1.html

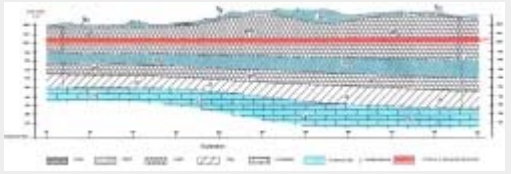
Director's Corner

10 July 2008


Barry Barish

The proposed Russian ILC site

One of the most difficult and tricky issues for the Global Design Effort in carrying out our design work is how to approach the siting issue for the ILC before proposals are actually solicited for hosting the machine. Conventional facilities are a major part of the project, accounting for almost one third of the total costs. Therefore, in order to bring as much reality to our reference design as possible, we asked for and studied three "sample sites," one from each region. In carrying out the reference design, regional subgroups that worked in parallel and were coordinated by our Conversional Facilities and Siting (CFS) group studied these sites. Since all three of our sample sites were deep sites about 100 metres underground, one of the questions that we postponed but flagged as important to study in the next phase were the comparative advantages and disadvantages of shallow sites. One specific example of a shallow site has been suggested to us by our Russian collaborators. We got a first look at this interesting site near Dubna, Russia, during our GDE meeting last month.


Profile of the shallow site near Dubna, Russia.

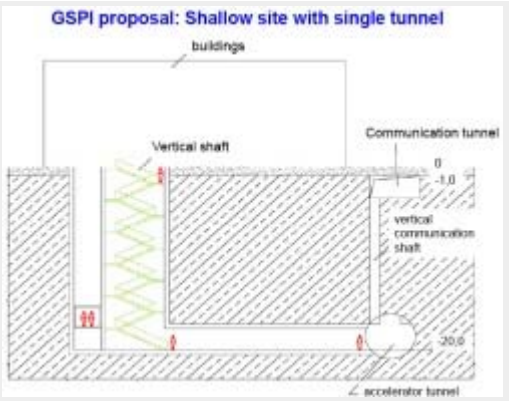
Our ILC baseline is for a deep site and we learned from our studies that all three sample deep sites could satisfy the requirements for the ILC. Although our baseline has not changed, we want to make sure we investigate alternatives for the project. For example we intend to investigate whether there could be significant advantages or cost savings for shallow sites. There are actually many difficult issues to consider for candidate shallow sites, including the flatness of the site, geology, seismic mitigation, protecting the ground water, land usage questions and many more. The Russian site offers one rather unique solution to many of these questions, which is why we plan to pursue our studies further for that site.

I should emphasise that our goal is not to favour one site over another, but rather to be ready to provide the best possible information to potential hosts for their ILC siting considerations. In our present models, the host will pay the major part of the siting costs. It will also be the host's responsibility to make the tradeoffs between location, technical features, costs and other considerations. Our work should help guide actual site studies. In addition, the machine design should be adapted to the sites to take advantage of existing facilities, and we will need to work with any potential hosts to optimise the design for their site.

While at Dubna, we met with representatives of the Russian State Project Institute (GSPI, Moscow) which has a 60-year history of designing and constructing Soviet and Russian nuclear power stations, nuclear centres and scientific accelerator centres (JINR Dubna, IHEP Protvino, ITEP Moscow, INR Troitsk). They have made a very preliminary study of the site and we carried out a set of discussions on their present understanding. We are now negotiating to set up a statement of work for some more detailed studies. The future work will include drilling one

1.6-metre borehole near the proposed location of the interaction region. The work at GSPI will be coordinated through JINR and the GDE oversight will be done by Wilhelm Bialowons, DESY.

The Russian site, as can be seen in the figure, has a thick layer of loam, a claylike substance, about 20 metres below the surface. This basically creates wetlands, since the surface water has nowhere to go. The loam layer appears good for drilling a tunnel, would not have problems with protecting the tunnel from the water or, even more importantly, protecting the ground water from potential radiation from the machine. Since this layer is so near the surface, the second service tunnel can be replaced by a surface or near-surface substructure that could be much less expensive than a second tunnel. Also, the services might be arranged in a more optimal and less expensive way than deep underground.



The Russian shallow beam concept, having a near surface service tunnel.

The proposed siting region is very thinly populated and practically free of industrial structures, rivers and roads. It is very steady seismically and it has stable geological characteristics. The flat relief and geological conditions would allow placing the ILC at a shallow depth of about 20 metres. The experimental halls and other large underground excavations could be done inexpensively using cut-and-cover techniques.

The proposed Russian ILC site located about 50 kilometres northeast of Moscow.

In addition to the Dubna site, we plan to study other possible shallow site solutions, for example in a desert. We are also doing value engineering on the deep sites to minimise the costs and will be looking at different models for sharing the costs of the ILC that may involve shared site costs. All of these studies will be done to enable us to give the best possible information to potential hosts. We do not expect to invite proposals until near the completion of the Technical Design Phase in 2012.

-- *Barry Barish*