

**Around the World**

**First cryomodule moves into NML  
Progress at Fermilab's ILCTA**



The first cryomodule on its way into the NML hall at Fermilab...  
(Photo: Fermilab)

Good news from an experimental hall at the edge of the prairie: Fermilab's ILC test area in the 'New Muon Lab' (NML) has just taken a major step towards completion with the installation of the first cryomodule on 6 August.

The test area, once complete, will represent one full RF unit of the ILC. This means there will be three full cryomodules powered by a 10-MW RF system, a cryogenic system capable of achieving temperatures of 2K and an injector beam line consisting of an electron gun and an accelerating capture cavity. The installation of the first phase of the project includes the first cryomodule, capture cavity, their respective RF power sources and the cryogenic system.  
[Read more...](#)

-- Barbara Warmbein

**Calendar**

**Upcoming meetings, conferences, workshops**

[EUROTeV Scientific Workshop](#)  
Uppsala University, Sweden  
26-28 August 2008

[CALICE Collaboration Meeting](#)  
Manchester, UK  
8-10 September 2008

[ILD meeting](#)  
Cambridge, UK  
11-13 September 2008

**Feature Story**

**LHC and ILC communications**



In April 2008, 76 000 visitors came to see CERN and the LHC underground installations during the CERN Open Day. Photo: CERN.

There it is: the LHC will start up in four weeks! We know the date of this special day when the protons will be injected into the tunnel: [10 September 2008](#). All eyes are on the LHC... but not exclusively. The start-up event as well as many other events which will follow are unique opportunities to promote our field, particle physics and science in general.  
[Read more...](#)

-- Perrine Royole-Degieux, ILC and LHC communicator

**In the News**

From *Beacon News*  
12 August 2008

**Fermilab applauds input from neighbors**

Over a year and a half, a group of 27 people from 13 Fox Valley communities have been learning all they can about Fermi National Accelerator Laboratory and the International Linear Collider.  
[Read more...](#)

From *interactions*  
11 August 2008

**LHC synchronization test successful**

The synchronization of the LHC's clockwise beam transfer system and the rest of CERN's accelerator chain was successfully achieved last weekend.  
[Read more...](#)

**Director's Corner**

**Spain's increasing involvement in large international science**



Roque de los Muchachos Observatory on La Palma at sunset

Did you know that Spain joined CERN as a Member State in 1961, but left seven years later? The modern era in Spanish particle physics was marked by Spain rejoining CERN in 1983, and the country's investments and programme in particle physics have continued to grow and thrive ever since. This is not the only large investment in Spanish science: I recently had the opportunity to visit the astronomical facilities at 2200 metres altitude on the Spanish island of La Palma, one of the Canary Islands. The La Palma Observatory is interesting to us in the ILC as we study examples of how international collaborations work for large science projects in preparation for developing our own models of international collaboration for the ILC.  
[Read more...](#)

-- Barry Barish

[Director's Corner Archive](#)

**Image of the Week**

**Getting a taste of the ILC**

[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

[Workshop of the Collaboration on Forward Calorimetry at ILC](#)  
Belgrade, Serbia  
22-24 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 *The Beacon News*  
9 August 2008  
**Our work, in the name of science**  
... When I first joined the task force, my focus was on local issues. Gradually, I came to appreciate the ILC as being one piece of a much bigger puzzle.  
[Read more...](#)

From *Süddeutsche Zeitung Magazin*  
8 August 2008  
**Raum der Erkenntnis**  
»Dunkle Materie«, »Dunkle Energie«: Bisher waren uns 95 Prozent des Weltalls ein völliges Rätsel. Aber jetzt beginnt die Wissenschaft zu verstehen, was da draußen wirklich los ist.  
[Read more...](#)

From *BBC*  
8 August 2008  
**Torchwood set for 'Big Bang' day**  
A special radio episode of sci-fi drama Torchwood is to be broadcast as part of BBC Radio 4's Big Bang day.  
[Read more...](#)

From *Christian Science Monitor*  
7 August 2008  
**Europe's Large Hadron Collider tests the bounds of physics – and budgets**  
...The proposed International Linear Collider (ILC), for instance, would smack electrons into an onrushing beam of positrons to create copious numbers of particles called the Higgs boson.  
[Read more...](#)



DESY's cavity preparation area had two important visitors last Friday: Masamitsu Naito of the Democratic Party of Japan (DPJ) and Tatsuhiro Kamada from Japanese Consulate in Hamburg toured the lab to get an impression of the technical and political status of the ILC. Naito is a member of the Japanese "[Federation of Diet members to promote the realisation of ILC](#)" and a former student of high-energy physics and went on to visit CERN at the beginning of this week. Photo: DESY

#### Announcements

##### arXiv preprints

[0808.0945](#)

Probing the ZZgamma and Zgammagamma Couplings Through the Process  $e^+e^- \rightarrow \nu \text{ anti-}\nu \gamma$

[0808.0477](#)

Measuring the Higgs-Vector boson Couplings at Linear  $e^+e^-$  Collider

[0808.0331](#)

Flavorful Z' signatures at LHC and ILC

[0808.0087](#)

MSSM Higgs Couplings to Bottom Quarks: Two-Loop Corrections

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*Progress at Fermilab's ILCTA*

Good news from an experimental hall at the edge of the prairie: Fermilab's ILC test area in the 'New Muon Lab' (NML) has just taken a major step towards completion with the installation of the first cryomodule on 6 August.

The test area, once complete, will represent one full RF unit of the ILC. This means there will be three full cryomodules powered by a 10-MW RF system, a cryogenic system capable of achieving temperatures of 2K and an injector beam line consisting of an electron gun and an accelerating capture cavity. The installation of the first phase of the project includes the first cryomodule, capture cavity, their respective RF power sources and the cryogenic system.

"The cryogenic infrastructure is nearing completion, so it was time to move the cryomodule in," says Jerry Leibfritz, Project Leader of the ILCTA. "Now we are looking forward to connecting it all up and running a first test." The waveguide system, designed and built at SLAC, is scheduled to arrive later this month and the plan is to be ready to begin cooling down the first cryomodule around December and to begin RF tests in the spring of 2009.

And it's not only the RF acceleration that can be tested once the full set-up is complete, but also the control systems, diagnostics, and instrumentation. There are also future plans for advanced accelerator R&D testing at the NML facility, including components such as crab cavities — a special type of cavity that gives the beams a flick just before the collision to make them collide sideways instead of head-on, thus increasing the collision rate.

Many were involved in the move of the cryomodule from Fermilab's Cryomodule Assembly Facility (CAF) to NML and even more watched it getting lowered into the test cave. Mike McGee, Fermilab's expert on cryomodule transport and vibration studies, continually monitored the forces and vibrations the cryomodule experienced during its two-mile transport across Fermilab.

The module that moved in has a [story of its own](#). Like a model plane assembly kit or a new shelf from IKEA, the full module arrived labelled down to the last screw and stored in boxes and containers. Its origin: DESY in Hamburg. People at DESY already know how to build these yellow giants because of their own test accelerator FLASH that uses almost identical modules. So they put one aside, packed it up and shipped both the parts and themselves over to Fermilab to pass on their expertise and find out whether their instructions worked. "We are excited to finally see the 'kit' module in action," says Kay Jensch from DESY who was involved in planning and supervising the assembly adventure.

The second phase of the NML project will see the installation of the second cryomodule and the injector for the beam, while part of the third phase may never get beyond the planning stage. For a full RF unit, the test accelerator needs the third cryomodule. "The plan had been to extend the building to house the third module and the full injector," explains Leibfritz. "We were planning on building a twin tunnel extending from the existing building into the corn fields to the North that could have housed a second RF unit in the future." But then the funding was cut and the plans had to be changed to keep progress moving forward, so now all three cryomodules will be put into the existing NML building. "It means that we had to shrink and simplify the injector. The beam will still have the same average beam current as the ILC, but it'll lack some of the other features," Leibfritz says. "Hopefully, the budgets will be restored in the future and we can return to our original plan of building a world-class test facility for the ILC."

-- Barbara Warmbein



The first cryomodule on its way into the NML hall at Fermilab...



...on the hook...



...and inside the test accelerator area with Project Leader Jerry Leibfritz.

(Photos: Fermilab)

## LHC and ILC communications

There it is: the LHC will start up in four weeks! We know the date of this special day when the protons will be injected into the tunnel: [10 September 2008](#). All eyes are on the LHC... but not exclusively. The start-up event as well as many other events which will follow are unique opportunities to promote our field, particle physics and science in general.

With the LHC start-up, public and media interest in particle physics is at an unprecedentedly high level. In order to work efficiently, our community needs to harmonise communication messages. Following the July 2006 CERN Council meeting in Lisbon where the *European Strategy for Particle Physics* was approved, a new communication group, the European Particle Physics Communication Network EPPCN, was born to strengthen the communication of particle physics in the Member States of CERN. This means that through the EPPCN network and the [InterAction collaboration](#), particle physics communications is now coordinated globally.

With 10 000 people working on the LHC around the world, coordination might sound tricky to achieve. However, coordination had to start in the individual countries, which sometimes turned out to be even more of a challenge! In many countries, communication needed to be harmonised between different agencies, universities and national labs. Evidence of this success is the recent release of national websites to explain LHC science and technology and also to promote each country's contribution to the project such as in the [US](#), in the [UK](#), in [Germany](#) and in [France](#).

A great number of events is being planned all over the world to celebrate the LHC. All of them are being coordinated with CERN around two major dates: the machine start-up in Summer 2008 and the official inauguration, on 21 October 2008. Just to name a few, in Germany the highlight will be a LHC exhibition in the "Bundestag" subway station close to the German Parliament building in Berlin, with festive events on 14 and 28 October. In France, the major museum of science "La Cité des sciences et de l'industrie" will dedicate a full day to LHC during its own open day. Milan, Italy, will be the place of a special "Accelerator day". For the start-up day on 10 September CERN and the Member States will invite the media to witness the LHC start-up and to conduct interviews with LHC scientists.

The role of all these networks is to ensure that positive and coherent messages are communicated on LHC. But more importantly, they help to convert the current interest of the public into sustained interest and support for science in general and particle physics in particular. What does that mean for the ILC? I believe 2008 will not only be the year of the LHC but also the year of particle physics. We know that the general public is fascinated by the scientific challenges of the machine and that they already want to know more about the future of our research field. That is the reason why it is a good time to communicate the ILC project. We wish CERN and all LHC collaborators that this start-up will be a success and will be followed by deep scientific discoveries. The LHC communication network, driven as an international endeavour, should be a model for the ILC community. We shouldn't be shy but should instead take this opportunity to talk about the next project: the ILC. Within a few months, many more versions of [The International Linear Collider - Gateway to the Quantum Universe](#) will be available for wide distribution (German, Italian, Spanish, Russian, Korean and French) in addition to the already existing English, Japanese and Chinese versions. They will help us to widely inform our audience about the challenging ILC project. Let us imagine that within a few years, a media-day around the ILC start-up is coming up...

-- Perrine Royole-Degieux, ILC and LHC communicator

[More about successful LHC synchronisation test](#)  
[Latest news about LHC start-up](#)



In April 2008, 76 000 visitors came to see CERN and the LHC underground installations during the CERN Open Day. Photo: CERN.



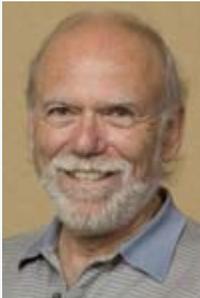
The CERN Control Centre will be the centre place for LHC start-up. Photo: CERN



In Berlin, a city train was transformed into the "LHC Express", circling around Berlin for one night on 14 June to promote CERN, the LHC and the future exhibition in the "Bundestag" subway station. Photo: DESY

## Director's Corner

14 August 2008



Barry Barish

### Spain's increasing involvement in large international science

Did you know that Spain joined CERN as a Member State in 1961, but left seven years later? The modern era in Spanish particle physics was marked by Spain rejoining CERN in 1983, and the country's investments and programme in particle physics have continued to grow and thrive ever since. This is not the only large investment in Spanish science: I recently had the opportunity to visit the astronomical facilities at 2200 metres altitude on the Spanish island of La Palma, one of the Canary Islands. The La Palma Observatory is interesting to us in the ILC as we study examples of how international collaborations work for large science projects in preparation for developing our own models of international collaboration for the ILC. The *Roque de los Muchachos Observatory* on La Palma has it all: the largest segmented telescope in the world (10.4 metres and built by Spain), advanced technical developments in adaptive optics that are extending the science programme of the

4.7-metre Isaac Newton Group telescope and an important high energy gamma ray telescope, MAGIC, with a 17-metre reflecting surface to detect Cerenkov radiation from gamma ray induced showers by focusing the Cerenkov radiation.

In June, I participated as a guest speaker in the "Campus of Excellence" programme organised by the University of Las Palmas de Gran Canaria and the Vitalia Foundation, a non-profit organisation created for running academic and cultural events in the Canary Islands. The programme is energetically directed by José R. Calvo, who brings together a prominent set of lecturers and panelists from science and government, providing an interdisciplinary event that covers a diverse set of subjects related to science and society for about 100 graduate students chosen from around the world. At our request, the meeting organisers arranged a long one-day flying-driving excursion that enabled a group of us to visit the European Northern Observatory on the remote island of La Palma. This was very informative and a most enjoyable day!

La Palma is one of the seven major volcanic islands called the Canary Islands, a part of Spain that is located in the Atlantic Ocean about 100 kilometres off of the west coast of Africa. The La Palma volcano rises almost 7 kilometres above the ocean floor and is alleged to be the steepest island in the world. There is road access from the airstrip to the very top, which we traversed through changing vegetation marking the different altitudes all the way to the summit at 2421 metres. The summit is part of the rim of a giant 9 kilometre wide and 1.5 kilometre deep crater where the various telescopes of the observatory are located - a most spectacular site. This is a near-perfect location for astronomy and it has therefore attracted a large set of modern astronomical instruments, ranging from solar to giant telescopes. The air is typically very dry and the clouds form between 1000 and 2000 metres, making for a very clear sky at the telescopes above the cloud layer.

The workhorse telescopes at the observatory have been the Isaac Newton Group (ING) that includes the 4.2-metre *William Herschel Telescope*. That telescope has an ambitious adaptive optics system to correct for the effects of scattering of light in the atmosphere and a laser guide star system to enable larger sky coverage. The ING is an international collaboration between the Science and Technology Facilities Council (STFC) of the United Kingdom, the Nederlandse Organisatie voor Wetenschappelijk Onderzoek (NWO) of the Netherlands, and the Instituto de Astrofísica de Canarias (IAC) in Spain. Recent scientific results include comparisons of eight examples of populations of galaxies falling towards the centres of galaxy clusters with control samples of galaxies far from the



Roque de los Muchachos Observatory on La Palma at sunset



Laser guide star aided adaptive optics for the 4.3 m telescope



The 10.4-metre Gran Telescopio Canarias

clusters. The collaboration found that the infalling galaxies in the cluster were predominantly distorted in shape and had higher than normal rates of star formation, suggesting the conditions needed for slow galaxy interactions and mergers are more likely to occur in galaxies falling into a galaxy cluster compared to the general population of galaxies outside clusters.

The ambitious *Gran Telescopio Canarias* (GTC), nicknamed GranTeCan, is at present time the largest reflecting telescope in the world with its 10.4 metres diameter. This around 130-million-Euro construction project represents a major investment in science by Spain, and the facility includes collaboration with institutions from Mexico and the University of Florida.

Another major facility at the observatory is *MAGIC* (Major Atmospheric Gamma-ray Imaging Cerenkov Telescope), a high-energy gamma ray telescope that detects Cerenkov radiation from particle showers released by cosmic gamma-rays. MAGIC has a 17-metre diameter reflecting surface, the largest in the world. MAGIC is sensitive to cosmic gamma rays with energies between 50 GeV and 30 TeV and will work in conjunction with the Gamma-ray Large Area Space Telescope GLAST recently launched into space to study sources of high-energy gamma rays. A second MAGIC telescope (MAGIC 2) located 85 metre away is almost complete.

In addition to these astronomical facilities, Spain has started a major third-generation light source project, ALBA, near Barcelona costing nearly 200 million Euros. They also have significant involvement in the LHC and have recently joined the ILC. Spain is very ambitious towards attracting large international projects and was a serious bidder to host ITER before France was selected. They are presently one of three countries bidding to host the more than 1-billion-Euro European Spallation Neutron Source (ESS).



The ALBA Light Source Facility, under construction near Barcelona

We fully expect Spain to play an important developing role in the ILC. The next meeting of the Funding Agencies for Large Colliders (FALC) will be hosted by Spain and held in Madrid next January. We plan to use that opportunity to arrange separate meetings with Spanish physicists and authorities where we will explore furthering our collaborations with Spain leading toward the ILC.

-- *Barry Barish*