WP 3: Dissemination and Outreach

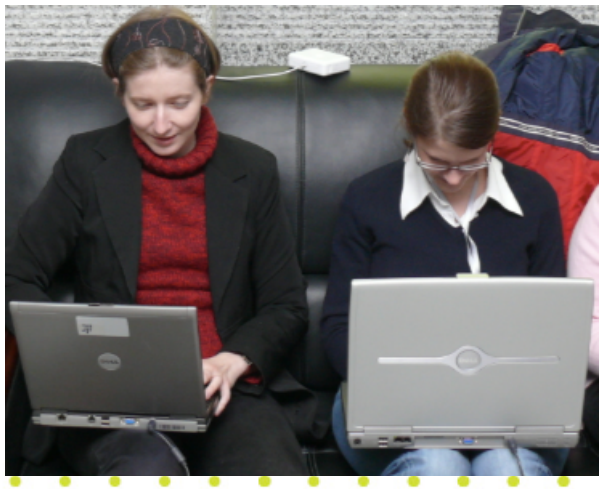
Perrine Royole-Degieux

ILC Europe Communicator

ILC-HiGrade annual meeting - 6 March 2009 – LAL, Orsay

The people involved

- WP Participants: DESY, CNRS, INFN, Oxford
- WP ‘Executives’: European ILC Communicators
  - **Barbara Warmbein (DESY)**
  - **Perrine Royole-Degieux (CNRS/IN2P3)**



ILC European communications activities

… in the larger framework of global communications

The global team

- 2 European communicators…
- 2 Asian communicators (KEK)

Rika Takahashi

Misato Hayashida

- A new US communicator (FNAL)… SOON (interviews are on-going)

‘European’ plan

- **Strategy**:
  - strengthen ILC collaboration : speak in one voice and unite the scientific community
  - build support in European governments and funding agencies
- **Specific messages**:
  - Europe plays a major role in the ILC and holds much expertise
  - Europe is a possible site
  - To keep leadership, Europe needs to commit to ILC
  - ILC European researchers are connected to LHC, XFEL, CLIC…

Global tools

- www.linearcollider.org
- ILC NewsLine
- Companion document to the ILC RDR “Gateway to the Quantum Universe”
- ILC brochure, press kit
- Presence at large international meetings
- ***NEW*** Technology Transfer brochure
- ***NEW*** ILC Bloggers (2 are European)
- Ideas for a new publication, one-pagers etc.

ILC NewsLine

Feature Story

***From interactions.org:* Five million Euros to prepare Europe for the International Linear Collider**

ILC-HiGrade will produce a mini series of cavities.

The partners of the 'ILC-HiGrade' proposal for the European Commission's Seventh Framework Programme have just started a contract for five million Euros funding over the next four years with the European Commission. 'ILC-HiGrade' stands for 'International Linear Collider and High Gradient Superconducting RF-Cavities.' One of

Around the World

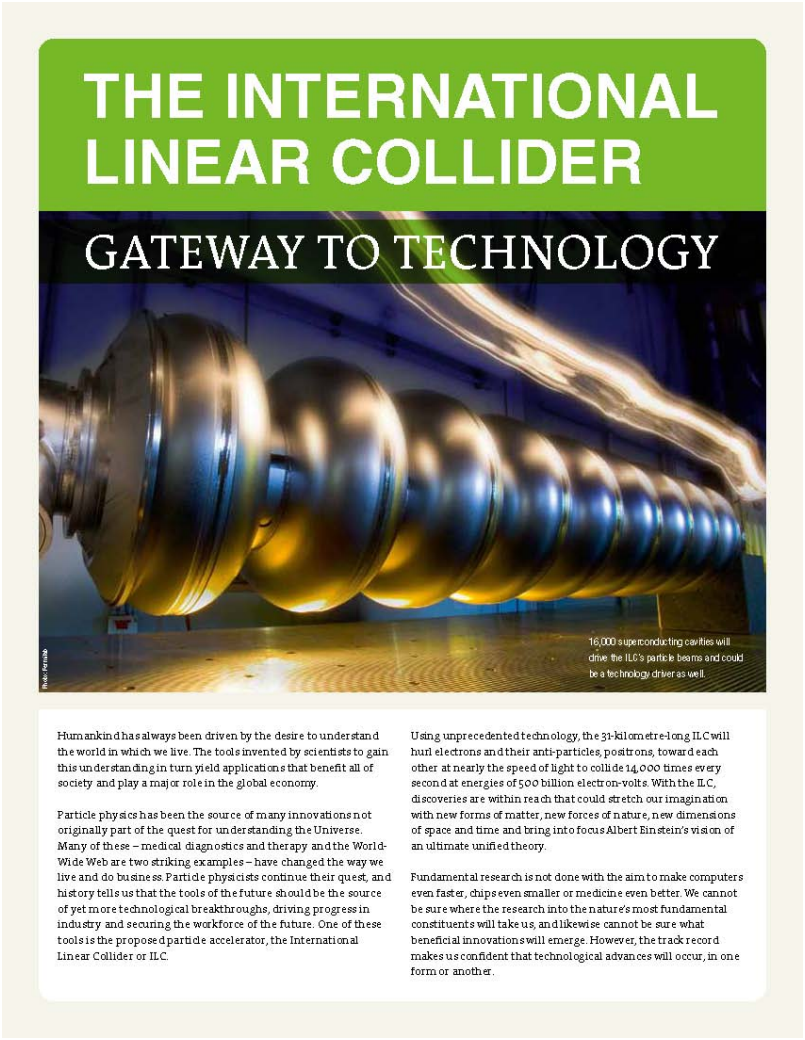
Thirty perfect cavities: liftoff!
European ILC-HiGrade project officially launched

ILC-HiGrade kicked off on Friday at DESY (Photo: DESY)

There are many official stages to a project financed by the European Commission – from call, proposal, negotiations, contract draft, start of work, annual reports to one of the most official events: the kick-off meeting. Europe's new flagship project on cavity production and exploration of international governance structures, ILC-HiGrade took this step last week.

- **2,090** subscribers (1850 last year) – **150** articles per year (including Barry's corners)
- **33** articles this year written by Barbara, Perrine or Brian
- **10** LHC-related articles or photos
- also FLASH & XFEL (5) and CLIC (1)
- **41** European-specific articles or photos

‘TT Brochure’



THE INTERNATIONAL LINEAR COLLIDER

GATEWAY TO TECHNOLOGY

16,000 superconducting cavities will drive the ILC's particle beams and could be a technology driver as well.

Humankind has always been driven by the desire to understand the world in which we live. The tools invented by scientists to gain this understanding in turn yield applications that benefit all of society and play a major role in the global economy.

Particle physics has been the source of many innovations not originally part of the quest for understanding the Universe. Many of these – medical diagnostics and therapy and the World-Wide Web are two striking examples – have changed the way we live and do business. Particle physicists continue their quest, and history tells us that the tools of the future should be the source of yet more technological breakthroughs, driving progress in industry and securing the workforce of the future. One of these tools is the proposed particle accelerator, the International Linear Collider or ILC.

Using unprecedented technology, the 31-kilometre-long ILC will hurl electrons and their anti-particles, positrons, toward each other at nearly the speed of light to collide 14,000 times every second at energies of 500 billion electron-volts. With the ILC, discoveries are within reach that could stretch our imagination with new forms of matter, new forces of nature, new dimensions of space and time and bring into focus Albert Einstein's vision of an ultimate unified theory.

Fundamental research is not done with the aim to make computers even faster, chips even smaller or medicine even better. We cannot be sure where the research into the nature's most fundamental constituents will take us, and likewise cannot be sure what beneficial innovations will emerge. However, the track record makes us confident that technological advances will occur, in one form or another.

“ILC scientists around the world are studying ways to meet the challenges and industry is getting ready to produce high-tech components, some of which will find their way into everyday life.”

- Commissioned by FALC
- Based on a FALC report : *“Technology Benefits Deriving from the International Linear Collider”* linearcollider.org/TechnologyBenefits
- Printed (yesterday!) in 2,000 copies
- Will be translated on-demand only

(like the ILC generic brochure)

- On the ILC website soon

Medicine

Computer-tomography scan of a human head.

Positron emission tomography (PET), a product of physics research into antimatter, has become an essential medical diagnostics tool, allowing previously unattainable views of chemical processes within live organs. Proton therapy is a powerful new treatment method delivering a concentrated, targeted dose of protons or ions precisely to the site of a tumour. Those treatments, however, currently need heavy and costly equipment. The ILC's new superconducting RF accelerating technologies make it possible to downsize the equipment and reduce its power consumption. Radiation therapy could become more focused and thus less damaging to healthy tissue by synchronising to the patient's breathing cycle. The superconducting technology could be adapted to produce monochromatic X-rays for medical diagnoses and treatment, enabling radically new probes of biological processes and tissue protein structure, and help develop new medicines.

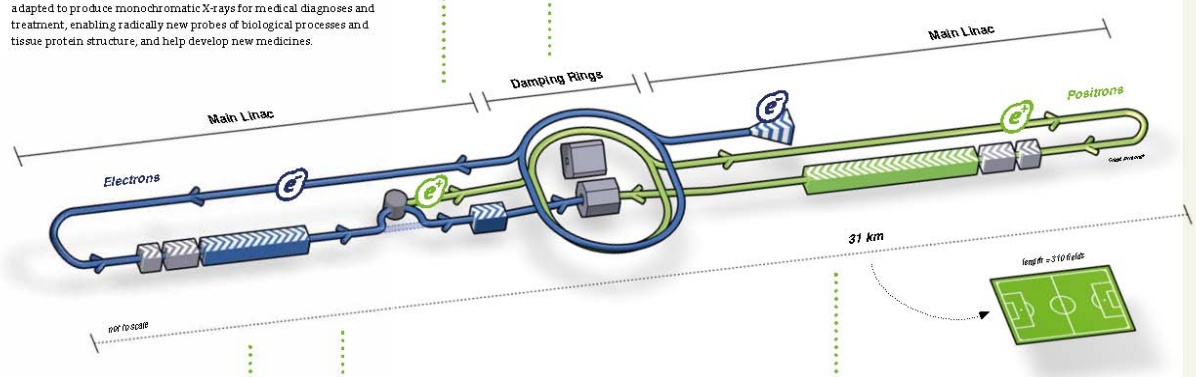
Computing

View of a particle physics computing centre.

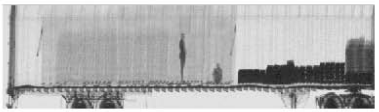
The data transfer rates from experiments like those at the ILC and the Large Hadron Collider, particle physics' current big adventure, are enormous – comparable to those for all the world's telecommunications put together. The latest computer and communications technologies and the advanced Grid data flow management software developed by particle physicists is essential to cope with the demands, but these now extend more broadly. The MammoGrid database developed in European laboratories distributes mammogram information among participating doctors and hospitals. A repository with 30,000 mammograms is now accessible, helping save lives.

POSSIBLE BENEFITS FROM ILC TECHNOLOGY

Challenging technologies are required for the International Linear Collider. Superconducting radio frequency (SCRF) cavities like the one shown on the front page will be used to accelerate particles to high energies. Unprecedented detector technologies will record the particles from the collisions. The whole ILC project is a challenge in terms of super-efficient particle acceleration, squeezing beam sizes to the nanometre scale and tracking particles to unprecedented precision. ILC scientists around the world are studying ways to meet these challenges and industry is getting ready to produce high-tech components, some of which will find their way into everyday life.



Tools for the future



Gamma-ray image of a cargo container.

The challenges of a new science project can greatly enhance many different industrial processes, thus driving technological development and the economy. For example, the tiny particle beams of the ILC need constant monitoring and fast, precise corrections. Tools developed for this purpose will help design very highly integrated electron circuit fabrication methods, which will be a major boost to many industrial processes and products at the nanometre scale. PCs could become more compact and lightweight thanks to improved technologies for electron beam lithography. Techniques originally used to give the accelerator's cavities their exquisite polish could lead to cheaper, better understood technologies for the metals industry. The expertise gained in producing 16,000 superconducting cavities and all the parts that drive them is likely to enhance superconducting applications in general. The electron sources developed for the ILC could enable new electron microscopes that would revolutionise the magnetic disk industry. Even customs officers' daily work may benefit from particle physics: with the help of detector technologies developed for particle collisions, cargo containers could be scrutinised very efficiently.

ILC Technology and other sciences

Protein structure imaged by X-ray scattering at a synchrotron accelerator.

Superconducting technology should advance work on Energy Recovery Linacs (ERLs), permitting substantial savings in size and cost. The ERLs will significantly expand the capabilities for studies in nuclear science, materials science, chemistry, structural biology and the environment. The first Free-Electron Lasers (FELs) now being built in the US, Japan and Germany are based directly upon linear collider research. Light sources have brought important advances within many sciences over the past few decades leading to many applications. For example, researchers at the Advanced Light Source in the US solved the structure of the avian flu virus and analysed its specificity to human receptors. The ILC technology can also be applied to the acceleration of protons and nuclei. Proton accelerators for intense spallation neutron sources provide a wide range of studies on biological properties. Numerous applications can also be found in material science, with direct implication on everyday life: medical implants, corrosion control, lighter airplanes and many more.

Environment

Superconducting technology could produce intense gamma rays to characterise the composition of nuclear waste. With this knowledge, high intensity neutron beams can be tailored to turn the waste into harmless stable nuclei. An Asian collaboration working in Japan is developing this potential. ILC radiofrequency power systems could enable remote chemical analyses of environmental hazards. Monitoring technologies for precise beam control could be used as a new early warning system for seismic activity.

European and HiGrade activities

- ✔ Deliverable 1: set up www.ilc-higrade.eu
- ✔ First press release: "*Five million Euros to prepare Europe for the International Linear Collider*" published 3 July 08 http://www.interactions.org/cms/?pid=1026394
- ✔ HiGrade Poster **NEW**

- Gateway to the quantum universe
  - ✔ **Translated into five languages (ru, sp, it, fr, ge).**
  - **Printing to come**
- New global publication in 6 European languages: draft version only

the Poster

- Presented in A0 format in Versailles, France at the *Fifth European Conference on Research Infrastructures (ECRI08)*
- An ILC short description + a Higrade paragraph

ILC-HiGrade: Towards the International Linear Collider

ILC-HiGrade or *International Linear Collider and High Gradient Superconducting RF-Cavities* produces a small series of accelerating cavities, superconducting components made of pure niobium for the International Linear Collider. It also plans a possible organisation and governance structure for the ILC as well as measures to prepare for the construction of the machine, including a detailed study on possible sites in Europe.

Participating Institutes:
- DESY (Germany)
- CEA (France)
- CERN (European Organization for Nuclear Research)
- CNRS/IN2P3 (France)
- INFN (Italy)
- Oxford University (United Kingdom)

The ‘passports’

- ✔ Pdfs are ready
- ✔ On ILC website soon

- Printing foreseen (on HiGrade funds)
- Distribution: to discuss

Near future

- **Write HiGrade yearly report** : we will put the European communications activities into the context of our international activities and describe our European strategy and tools.

- Find reliable translation procedures
- Maintain our established tools, translate and distribute them
- Design European-specific one-pagers
- ‘Gateway to the Quantum Universe’ website in 6 languages (pending budget)