

LC NEWSLINE

THE NEWSLETTER OF THE LINEAR COLLIDER COMMUNITY

FEATURE

Unplugged: new magnet concept could lower CLIC's power bill

by Barbara Warmbein



Spirits lifted by a motivating talk by CERN's new Director-General, scientists attending the recent CLIC workshop say that there's a lot that's happening in the world of the Compact Linear Collider study.

DIRECTOR'S CORNER

US-Japan symposium

by Lyn Evans and Hitoshi Murayama



As is well known, the International Linear Collider (ILC) is being discussed as an International project, which means many countries around the world would contribute human, technical, and financial resources to the project. This is clearly a very complicated proposition and it takes effort from many directions to keep it moving.

VIDEO OF THE WEEK



New results on the Search for Gravitational Waves



Albert Einstein, *Näherungsweise Integration der Feldgleichungen der Gravitation*, ZS 6 Berlin 1916

Barry C Barish
LIGO Laboratory
Caltech
11-Feb-2016




LIGO-G190214

New results on the search for gravitational waves – the video

by Perrine Royole-Degieux

You cannot possibly have missed that gravitational waves have recently been discovered by the LIGO-VIRGO scientific collaborations. But in case you missed the talk at CERN explaining it, you can watch it here. See also "A dream comes true" from the last issue of LC NewsLine, a personal view of the discovery by Barry Barish.

IN THE NEWS

from *I am wire*

2 March 2016

Here Are The Stalwarts Speaking at IIT Kanpur's Techkriti'16 Talks

We will also hear Dr Lyn Evans, Director, Linear Collider collaboration at CERN. He has also served as the project leader of Switzerland-based Large Hadron Collider in the past. On December 11, 2012, he was awarded the 2012 Special Fundamental Physics Prize.

from *Iwate Nippo*

27 February 2016

ILC東北誘致、専門の小委員会設置 国際加速器委

世界の素粒子物理学研究所のトップらでつくる国際将来加速器委員会（ICFA）のヨアヒム・ムニツク委員長ら日米欧の主要メンバーは26日、東京都内で記者会見し、国際リニアコライダー（ILC）の実現を目指して専門の小委員会を設置すると発表した。（Members of ICFA include the chair, Joachim Mnich had a press conference on 26 February in Tokyo, reorted to establish new working group toward the realization of the ILC）

from *Iwate Nichi Nichi*

25 February

ILC誘致の未来描く 絵画コン高学年の部

県南広域振興局が「国際リニアコライダー（ILC）」をテーマに小学生から募集した絵画コンクールの表彰式は24日、奥州市水沢区の奥州地区合同庁舎分庁舎で行われ、2部門の入賞32点を表彰した。（The awarding ceremony for the ILC drawing contest was held On 25 February at Oshu cityhall.）

from *Denki Shimbun*

22 February 2016

ILC誘致、産学官一体で準備 - 東北経済連・高橋会長

東北経済連合会の高橋宏明会長（東北電力相談役）はこのほど、米ワシントンで開かれた日米先端科学技術フォーラムに出席し、北上山地（岩手県、宮城県）への国際リニアコライダー（ILC）誘致に向けたプレゼンテーションを行った。（Hiroaki Takahashi, the chairman of the Tohoku Economic Federation visited Washington DC to attend the US-Japan Forum, and made presentation toward the realization of the ILC in Kitakami area）

from *Government of the Russian Federation via noodls*

20 February 2016

Celebrating the 60th anniversary of the Joint Institute for Nuclear Research

The Joint Institute for Nuclear Research (JINR) is an international intergovernmental organisation established in 1956 in Dubna to integrate the scientific and material potential of the member states of the institute to study fundamental properties of matter. The JINR includes 18 countries and six states that collaborate with it. Celebrations of the institute's 60th anniversary in 2016 will help strengthen international scientific and technical cooperation, the credibility of one of the oldest international intergovernmental organisations and improving the social status of scientific activity.

from *CERN*

17 February

Awakening acceleration: AWAKE's plasma cell arrives

What if there was a technology that could accelerate particles with hundreds of times more power than current methods? The AWAKE experiment, under construction at CERN, is preparing to test this question with proton-driven plasma wakefield acceleration.

ANNOUNCEMENTS

Asia-Pacific School of High-Energy Physics

The third Asia-Europe-Pacific School of High-Energy Physics, [AEPSHEP2016](#), to be held near Beijing, China, 12-25 October 2016, is open for applications. The deadline is 25 March 2016. AEPSHEP is held every second year, hosted in countries in the Asia-Pacific region. The first two Schools in the series were held in Fukuoka, Japan, in 2012 and Puri, India, in 2014.

Applications to attend the School are invited particularly from students from countries in the Asia-Pacific region and from Europe, although applications from other regions will also be considered. The programme of the school will be at a level appropriate for PhD students in experimental particle physics. The School is open to junior post-docs and advanced MSc students.

Wherever possible participants are expected to obtain funding for the fee as well as their travel from their home countries. However, some sponsorship will be available for a limited number of students from countries with developing programmes in particle physics. Eligible students are therefore encouraged to apply even if they do not expect to obtain funding from their home institute to attend the School.

CALENDAR

Upcoming events

[ECFA Linear Collider Workshop](#)
Santander, Spain
30 May- 05 June 2016

Upcoming schools

[Joint Universities Accelerator School](#)
Archamps, Haute Savoie, France
11 January- 18 March 2016

[View complete calendar](#)

PREPRINTS

ARXIV PREPRINTS

[1602.09050](#)

Design of Pre-Dumping Ring Spin Rotator with a Possibility of Helicity Switching for Polarized Positrons at the ILC

[1602.08552](#)

Updated Results of a Solid-State Sensor Irradiation Study for ILC Extreme Forward Calorimetry

[1602.08439](#)

Dark matter relic density from observations of supersymmetry at the ILC

[1602.08352](#)

The BSM Physics Case of the ILC

[1602.08041](#)

Neutral Higgs Boson Production at e^+e^- Colliders in the Complex MSSM: Towards the LC Precision

[1602.08040](#)

SUSY Fits and their Implications for ILC and CLIC

[1602.08035](#)

Top Physics in WHIZARD

[1602.07748](#)

DSiD: a Delphes Detector for ILC Physics Studies

[1602.07697](#)

The Higgs mass and natural supersymmetric spectrum from the landscape

[1602.07020](#)

Future Colliders Symposium in Hong Kong: Scientific Overview

[1602.06973](#)

Generalized focus point and mass spectra comparison of highly natural SUGRA GUT models

[1602.06270](#)

Automation of NLO processes and decays and POWHEG matching in WHIZARD

[1602.05991](#)

Bounds on the electromagnetic dipole moments through the single top production at the CLIC

[1602.05288](#)

Search for the $a_0(980)$ - $f_0(980)$ mixing in weak decays of Ds/Bs mesons

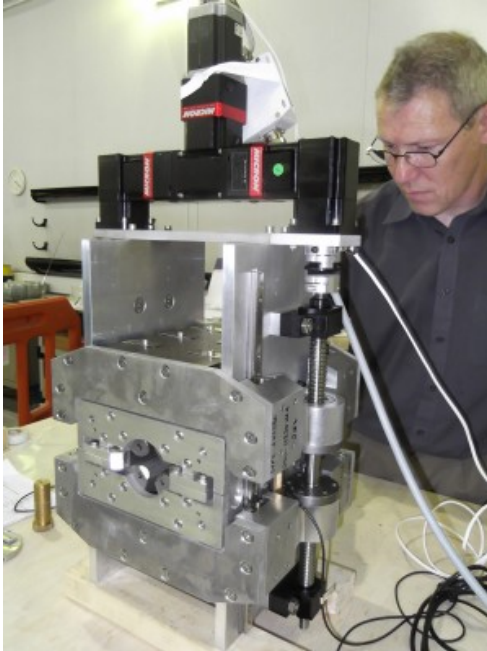
[1602.05043](#)

Physics at the FCC-ee

FEATURE

Unplugged: new magnet concept could lower CLIC's power bill

Barbara Warmbein | [3 March 2016](#)



Permanent-magnet prototypes in a workshop at Daresbury Lab. Images: STFC

Scientific workshops don't really need ice breakers, but the [CLIC workshop](#), held from 18 to 22 January at CERN in Geneva, Switzerland, had one nevertheless. Coinciding with the first day of the workshop, CERN's new Director-General Fabiola Gianotti gave her inaugural address to the lab, presenting CERN's high-energy physics plans for the coming years and reminding everyone that both CLIC and the Future Circular Colliders study are part of CERN's high-priority research and development programme in preparation for the next European Strategy exercise 2019/20. "It was a real shot in the arm for the community," says Phil Burrows, CLIC Accelerator Collaboration Spokesman. "It's good to hear what you work on being referred to as a high-priority project."

CLIC is an ambitious project with a target collision energy of 3 Tera-electronvolts and an accelerating gradient – the measure of how quickly particles gain that energy – of 100 Megavolts per metre. This is 20 times higher than that used in LHC and some three times higher than the designated gradient of the ILC. The particles are pushed along by a drive beam that transfers its energy to the main beam at regular (and very precise) intervals. A feed-forward system will make sure that the drive beam and main beam are perfectly synchronised so that the main beam gets the best push possible. A prototype of this system delivered its first results at CTF3 late in 2015. "It almost meets our design specifications of 50-femtosecond precision," says Burrows. "This is four times better than achieved in our first tests in 2014."

Ambitious projects often consume a lot of power. A team from STFC's Daresbury Lab and CERN are working a solution to reduce CLIC'S power bill by replacing power-hungry electromagnets with permanent ones – magnets unplugged, so to speak. In order to focus and bundle the particle beams, the Conceptual Design Report foresees tens of thousands of electromagnets along the beamlines. These include about 42,000 quadrupoles for the drive beam. Because they are tuneable these permanent magnets would fulfil CLIC's high-precision requirements: they can be adjusted precisely to correctly focus the drive beam as it loses energy by fulfilling its mission of powering the main beam. The team has already produced successful prototypes of the drive-beam quadrupoles and is currently looking at several different options for permanent magnets for other parts of the beamline complex. [For further details see Jim Clarke's plenary talk](#)

The CLIC accelerator experts are in the process of developing and testing new structures to reach the required high accelerating gradients as reliably and as cheaply as possible. One new design originates from SLAC National Lab in the US. It incorporates a simplified production procedure, with cavities coming in two halves, which could potentially make them cheaper and easier to produce in industry. For more details see [Walter Wuensch's plenary talk](#).

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US-Japan symposium

Lyn Evans and Hitoshi Murayama | [3 March 2016](#)

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Recently, three Diet Members and leaders of the Federation of Diet Members to Promote ILC in Japan, Mr. Ryu Shionoya, Mr. Shunichi Suzuki, and Mr. Taku Otsuka visited Washington DC to meet their US counterparts as well as officials of Department of Energy (DOE) to discuss a closer US-Japan collaboration in science and technology, including the ILC. On the first day there was a reception at the Congressional building. Unfortunately it was scheduled at the time of an important vote in the House, so attendance by Congress staff was very poor. Fortunately there was a reception at the Residence of the Japanese Ambassador on the same evening where attendance by US administrative officials was much better.



Hon. Shionoya is recommending the Kasoku Kids cartoon book to the roundtable discussion chaired by Dr. William Schneider, Jr. (Hudson Institute)

An important meeting took place on 12 February where the three Diet members met Dr. Cherry Murray, Director of the Office of Science of DOE, Dr. James Siegrist, Director of the High Energy Physics, as well as Mr. Hiroshi Ikukawa, Deputy Director of the Research Promotion Bureau in MEXT (Ministry for Education, Culture, Sports, Science, and Technology).

At this meeting, there was broad agreement that the discussions on ILC participation by the US should proceed bilaterally rather than trying to involve all potential partners at the same table from the beginning. (It does not preclude a separate discussion between European countries and Japan.) There were active discussions about the issues concerning governance of such a large-scale international project, and possible formation of a "Discussion Group" between DOE and MEXT about this. It was clearly identified that Dr. Murray and Mr. Ikukawa would be the proper counterparts for further discussions.

There was also a separate meeting between US and Japanese scientists organised by the Hudson Institute. Both sides reiterated enthusiasm for the ILC project, citing community studies such as Snowmass and the P5 report as examples. The physics case remains as strong as ever. In particular, given the discovery of the Higgs boson in 2012, this is a rare occasion when we know exactly what machine to build to guarantee exciting physics results.

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VIDEO OF THE WEEK

New results on the search for gravitational waves – the video

Perrine Royole-Degieux | [3 March 2016](#)

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