LC NEWSLINE
THE NEWSLETTER OF THE LINEAR COLLIDER COMMUNITY

AROUND THE WORLD

Calorimeter under telescope scrutiny

by Barbara Warmbein



While the CALICE collaboration is still busy analysing the data taken at last year's big test campaign the team planning the hadronic calorimeter for the ILD detector are already gathering new data. This time they looked at the performance of a few prototype layers in a test beam connected to a beam telescope.

DIRECTOR'S CORNER

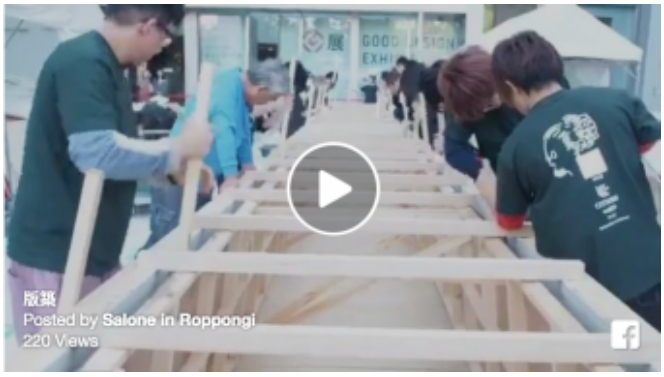
Strasbourg steers ILC towards ESRFI roadmap

by Akira Yamamoto

Reporting from the French city of Strasbourg, Asian Regional Director Akira Yamamoto says that he was encouraged by a dedicated forum about the ILC, the ESFRI roadmap and next steps held with political and science officials this Monday. It was part of the IEEE Nuclear Science Symposium and Medical Imaging Conference that continues until Sunday 6 November.



VIDEO OF THE WEEK



Construction completed: ILC in Roppongi

by Rika Takahashi

Did you know that the ILC has already been built? Neatly nestled into the lush hills of the Kitakami region it produces collisions... of art and science. We're talking about a 15-metre mockup that's part of the biggest art event in Tokyo in one of the trendiest places in town. Watch it being made in the video.

IN THE NEWS

from *Forbes Japan*
December 2016
Continuing challenge connect to innovation
Lyn Evans, LCC Director, talks about Japan's innovation power (print only).

from *COSMOS*
2 November 2016
Can corkscrewing lasers solve an enduring particle physics mystery?
A physicist may have finally figured out how to create as-yet evasive magnetic monopoles. Actually doing it, though, is still a little way off. Cathal O'Connell reports.

from *Jiji.com*
1 November 2016
世界一ノーベル賞を獲らせる男、リン・エバンス博士も緊急来日！国際リニアコライダーの巨大ジオラマ模型が六本木ミッドタウンに出現。サローネ・イン・ロツポンギ11月6まで開催中
現在、六本木にある東京ミッドタウンで次世代型先端科学、国際リニアコライダー誘致計画をアピールするインスタレーション展示が行なわれている。作品を手がけるのは建築家の長坂常氏。全長31km本計画を1/2000のスケールにし、15mを超える巨大ジオラマ模型にして展示中。中央の衝突点ではライゾマティクスがイメージ映像を制作。難解な物理学がわかりやすく楽しく表現されている。

from *Tanko Nichinichi*
1 November 2016
都心に北上山地の模型 （全長１５メートル、長坂常氏＝建築家＝が設計）
　北上山地が建設候補地となっている素粒子研究施設・国際リニアコライダー（ＩＬＣ）の巨大ジオラマ模型がこのほど、東京都港区の「東京ミッドタウン」にお目見えした

from *J-wave*
30 October 2016
次にデザインしたいものはなんですか?
Radio program "Growing Reed" by Junichi Okada. Jo Nagasaka, the architect designed ILC mock up in Roppongi discussed about ILC and his architect.

from *17 wh*
22 October 2016
王贻芳再谈大型对撞机：让中国成为"世界第一"的一项政治决定
Wang Yifang talk Large Collider: let China become a "world first" a political decision

from *Premium Chosun*
21 October 2016
차세대 수퍼급 입자가속기 개발 경쟁 (Competition to develop next-generation super-class particle accelerator)
유럽입자물리연구소(CERN)의 거대강입자가속기(LHC)의 뒤를 이을 차세대 가속기 개발 경쟁이 뜨겁다. 우주 만물의 탄생 설명을 가능케한 힉스 입증에 혁혁한 공을 세운 LHC에 뒤질세라 일본과 중국이 차세대 가속기 자리를 놓고 주도권 경쟁을 벌이고 있다. (Next Generation Accelerator (LHC), the next-generation accelerator (LHC) of the European particle physics laboratory (CERN) Development competition is hot. Higgs demonstrates the ability to explain the birth of the universe. Japan and China are competing to take the lead in the next generation of accelerators.)

from *Seoul Economic Daily*
20 October 2016
[문병도의 톡톡 생활과학] 제 2의 '신의 입자'를 찾아라…가열되는 입자 가속기 경쟁
Look for the second 'God particle' … Heating particle accelerators competition

from *symmetry*
18 October 2016
It came from the physics lab
Settle in for a physics-themed Halloween movie marathon.

CALENDAR

Upcoming events

International Workshop on Future Linear Colliders (LCWS2016)
Morioka, IWATE (Japan)
05- 09 December 2016

Upcoming schools

Tenth International Accelerator School for Linear Colliders
Susono, Shizuoka, Japan
08- 19 December 2016

View complete calendar

PREPRINTS

ARXIV PREPRINTS

1611.00009
Radiative Yukawa Couplings in the Simplest Left-Right Symmetric Model

1610.09398
Neutralino pair production via photon-photon collisions at the ILC

1610.07170
Design of beam optics for the Future Circular Collider e+e- -collider rings

1610.06205
Natural generalized mirage mediation

ANNOUNCEMENTS

LCWS2016 early registration deadline extended

The early registration deadline for LCWS2016 in Morioka, Japan, has been extended to 7 November.

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AROUND THE WORLD

Calorimeter under telescope scrutiny

Barbara Warmbein | 3 November 2016



There's a cable in my sandwich: calorimeter experts recently tested layers of hadronic calorimeter with the DESY beam telescope. Image: Adrian Irles, DESY/LAL

In the last years, the various prototypes for one of the possible future hadronic calorimeters – that part of a detector that measures the energy of all passing particles – have gone through a broad variety of tests in a variety of configurations. However, they have never before been tested in connection with a beam telescope – until now. In a little over a week in October, a small team from DESY, the University of Sussex and Prague University tested the performance of six layers of future detector in connection with the AIDA/EUDET beam telescope. The goal was to check whether the two could indeed work together – a proof of principle of sorts – and gather more details of the tile structure and spatial resolution of the calorimeter.

Normally the setup is a bit like a horizontal sandwich: two arrays of telescope detectors layers form the bread that holds the filling – the test object. Here, the test object (six layers of hadronic calorimeter) sat behind two parts of telescope toast because the six calorimeter layers would not have fit the space. The working principle is the same, however: any beam particles coming from the accelerator (DESY's electron synchrotron in this case) pass through telescope and test object, so anything the telescope sees should be seen by the test object as well. In the beginning this proved a challenge for the HCal team because of the configuration of the telescope that currently caters more for LHC detector tests.

Detectors for the linear collider do not need to disentangle events and select which ones to keep and which ones to throw away, like detectors at the LHC. At the linear collider there's a large gap between particle bunches colliding and the collisions are less messy because it's collisions between elementary particles, electrons and positrons, rather than particles with a substructure like the protons at the LHC. That's why linear-collider detectors don't have a trigger that would make a synchronisation with the information from the telescope easier. "We had to figure out which particles seen by the telescope correspond to which particles seen by us," explains DESY HCal expert Katja Krüger. So before they could start taking real data the HCal team had to make a few modifications to make sure they could synchronise their data with the information from the telescope.

The team scrutinised six new layers and will repeat tests in December this year to take advantage of the improved coordination with the beam telescope and add absorber layers. The HCal uses scintillator tiles measuring three by three centimetres with a silicon photomultiplier or SiPM detector. The telescope technology is based on monolithic active pixel sensors and has a very high spatial resolution: it tells users with a precision of 2 microns where particles have passed. The calorimeter team is using this precision to check if their tile structure and the spaces between tiles are visible in the data and how their prototype resolves electron showers, which play an important role in the "working" configuration with absorber layers sandwiched between the detector layers. In return, the run with linear collider detector prototypes helps prepare the beam telescope for future tests for example under the AIDA-2020 project with other prototypes, both individually and as a combined campaign.

Last year, the CALICE collaboration spent a total of ten weeks in test beams at CERN and DESY testing different calorimeter prototypes and are still in the process of analysing the more than 15 million events recorded during the campaign. At the same time, planning is already underway for the next big milestone: a full prototype, planned for 2018.

BEAM TELESCOPE | CALICE | CNRS/LAL | DESY | DETECTOR R&D | HADRONIC CALORIMETER | PRAGUE | SUSSEX

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DIRECTOR'S CORNER

Strasbourg steers ILC towards ESRFI roadmap

Akira Yamamoto | 3 November 2016



Opening IEEE: Junichi Nishiyama (AAA), Takashi Nishioka (AAA), Rolf-Dieter Heuer, Catherine Trautmann, Hon. Shintarou Ito, Hon. Takeshi Shina, Satoru Yamashita (from right to left)

The 2016 IEEE Nuclear Science Symposium and Medical Imaging Conference (NSS/MIC) is being held in Strasbourg, France from 29 October to 6 November. The opening plenary addressed a central pillar necessary to make fundamental research progress at a pace reflecting mankind's ability to take up challenges and push the frontiers of knowledge – very large infrastructures, requiring world-wide expertise and effort provided through enhanced international cooperation, are essential to today's (and tomorrow's) research landscape.

Chaired by Rolf Heuer, former CERN Director-General, the opening session contained two keynote presentations: Immaculada Figueroa, Executive member of the European Strategy Forum on Research Infrastructures (ESFRI), presented plans for the update of its roadmap for the year 2018 and Atsuto Suzuki, former KEK Director General, spoke about international research cooperation from a Japanese perspective. Suzuki gave an excellent overview of Japan's participation in large-scale research infrastructure projects, such as the International Space Station ISS, the ITER fusion project, neutrino programmes plus a special emphasis on the International Linear Collider (ILC). The session was followed by greetings from two Japanese Diet Members, the Honorable Shintaro Ito and the Honorable Takeshi Shina. I was very impressed with their enthusiastic statements about and encouragement of the ILC project. Another highlight was a talk by Barry Barish of Caltech, former Director of the Global Design Effort for the ILC, called "Einstein's Gravitational Waves Observed."

A dedicated forum about very large transregional research infrastructures took place later that afternoon with people knowledgeable about the EU, Strasbourg City and Eurometropole officials, directors of major particle physics laboratories, representatives of funding agencies and special guests. Among the highlights were contributions from the Hon. Shintaro Ito, Japanese Diet member, Takashi Nishioka, Chair of the Japanese Advanced Accelerator Association promoting science and technology (AAA) and Catherine Trautmann, former French Minister and member of the EU Parliament. The discussion concentrated on the importance of concrete next steps towards the realisation of the ILC between European countries and Japan in the coming two years, and the opportunity for the ILC to re-appear on the ESFRI roadmap.



My personal summary is that there were very positive and forward-looking discussions, and I have been much encouraged for the prospects of realising the ILC.I deeply thank Maxim Titov, 2016 IEEE NSS/MIC General Chair and Marc Winter, Conference Liaison to the EU, who co-organised this event.

ESFRI | EU | IEEE | INSTRUMENTATION | JAPAN

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VIDEO OF THE WEEK

Construction completed: ILC in Roppongi

Rika Takahashi | 3 November 2016

A total of 200 people, mostly students from art colleges, finished the construction of the ILC in Roppongi on 29 October. The ILC mockup that is. The ILC exhibition at Salone in Roppongi is now open until Sunday, 6 November. A 15-metre-long mock up of the ILC made by many hands in the traditional construction technique of “rammed earth” attracts many visitors to DESIGN TOUCH, one of the biggest art event in Tokyo situated in a very hip area in downtown Tokyo. Read more about the project which is the brainchild of Japanese architect Jo Nagasaka, who did some earth ramming himself during the construction of the model.



Image: Atsushi Kondo

Lyn Evans, Director of Linear Collider Collaboration visited the exhibition on 3 November. “This is a very nice way of communicating with many people. It is encouraging to meet so many people who are positive about the ILC in Tokyo,” said Evans. This event surely helps to outreach to wider audience. See more pictures of the event on Facebook.

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