

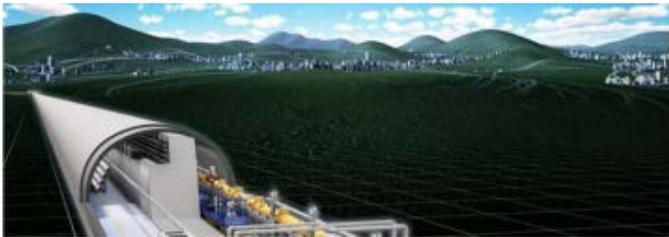
# IC NEWSLINE

THE NEWSLETTER OF THE LINEAR COLLIDER COMMUNITY

## FEATURE

### What does the P5 report mean for the International Linear Collider?

by Joykrit Mitra



The 2014 P5 report makes provisions for significant US participation in the ILC construction, should the project move forward. The particle physics community recognises the imperative for US participation in the project to maintain its leadership position in high-energy physics.

## DIRECTOR'S CORNER

### Linear Collider School switches lakes

by Brian Foster

The Linear Collider school, a week of intense lectures and discussions on all things linear, has just taken place at lake Chiemsee in Germany, switching from its former venue in the UK's Lake District to Bavaria. Brian Foster, European Director in the Linear Collider Collaboration, was one of the lecturers and reports about exotic PhDs and linear collider news from a monastic setting.



## IN THE NEWS

from *Iwate Nippo*

13 August 2014

**ILC誘致、生徒が大看板でPR 一関・大原中生が制作**

一関市大東町の大原中と同校PTAは、超大型加速器、国際リニアコライダー（ILC）の誘致実現へ看板を制作している。生徒自らデザインやメッセージを考え、ILCがもたらす将来の希望を表現。看板は関係者が視察に訪れる地元大原地区に月内に設置し、候補地の思いを伝える。(Ohara junior high school and its Parents Teacher Association are planning to make a big ILC sign board to support the project. The sign board is designed by the students, and will be put up on the road side in August.)

from *The European*

13 August 2014

**Vom Risiko lernen**

Wenn die Bevölkerung ein Unbehagen vor der Technik verspürt, ist es Aufgabe der Wissenschaft, etwas daran zu ändern.

from *Iwate Nippo*

8 August 2014

**ILC題材に実験、分かる喜び 一関・大東で交流会**

県発明協会主催のいわて少年少女発明クラブ夏休み交流会は5日、一関市大東町の大原公民館で開かれた。国際リニアコライダー（ILC）を題材に講義と実験が行われ、科学に関心の高い子どもたちが計画に理解を深め、実現へ期待を高めた。(Iwate Institute of Invention and Innovation held a ILC workshop for children on 5 August at Ohara community center at Daito town,

Iwate prefecture.)

**from Iwate Nippo**

2 August 2014

[英語で「おもてなし」 奥州14企業で研修スタート](#)

国際リニアコライダー（ILC）の北上山地への建設実現を見据え、奥州市国際交流協会は1日、市内の民間企業を対象に「おもてなし」に関する英語研修会を同市水沢区の奥州商工会議所で初めて開いた。ホテルや銀行、不動産など14企業が参加し、多業種での外国人受け入れの浸透を目指していく。(In anticipation of the ILC construction at Kitakami area, Oshu International Relations Association held their first English communication workshop for business persons. Staffs from 14 local companies including hotels, banks, or real estates were attended to offer necessary services for foreign residents.)

**from Next Big Future.com**

31 July 2014

[Renewed hope for EmDrive with NASA validation ... is this a Chicago Pile moment ?](#)

SPR Ltd is working on a superconducting demo which should be 100 times more powerful than the first version and provide 30 newtons of force instead of 315 milli-newtons. China is also building a large S-band thruster.

Superconducting radiofrequency (SCRF) cavities are also the main technology for a new international linear collider.

**from Iwanhci Online**

31 July 2014

[ILC もっと気軽にサイエンスカフェ始動 中高生ら関心高く](#)

一関市が主催する「いちのせきサイエンスカフェ」は29日、同市大手町の一関図書館で開かれた。地元の中高生ら25人が参加し、国際リニアコライダー（ILC）の専門家による講話や意見交換を通じて建設実現に夢を膨らませた。(The first Ichinoseki Science Cafe, a new initiative held by Ichinoseki city, Iwate prefecture, was held on 29 July at the Ichinoseki city library. 25 junior high and high school students were attended and expected for the start of construction of the ILC.)

**from SLAC Today**

30 July 2014

[Science of SLAC Video – ‘SLAC Goes Cryo’](#)

The major LCLS upgrade known as LCLS-II will require an entirely different type of accelerator technology at SLAC based on superconducting radiofrequency (RF) cavities.

## CALENDAR

### Upcoming events

[POSIPOL 2014](#)

Ichinoseki, Iwate, Japan  
27- 29 August 2014

[27th Linear Accelerator Conference \(LINAC14\)](#)

Geneva, Switzerland  
01- 05 September 2014

[SiD Workshop](#)

University of Tokyo, Tokyo, Japan  
02- 03 September 2014

[MDI-CFS Meeting on ILC Interaction Region Issues](#)

Otemachi, Ichinoseki, Iwate, Japan  
04- 06 September 2014

[ILD meeting 2014](#)

Oshy City, Iwate, Japan  
06- 09 September 2014

[3rd International Beam Instrumentation Conference \(IBIC 2014\)](#)

Monterey, California, USA - hosted by SLAC  
14- 18 September 2014

[View complete calendar](#)

## PREPRINTS

### ARXIV PREPRINTS

[1408.4295](#)

Double Higgs production in the littlest Higgs Model with T-parity at high energy e+e- Colliders

[1408.4191](#)

Impact of top-Higgs couplings on di-Higgs production at future colliders

[1408.3563](#)

Influence of anomalous VVH and VVHH on determination of Higgs self couplings at ILC

[1408.3013](#)

Supersymmetric SO(10) Grand Unification at the LHC and Beyond

[1408.1961](#)

Superpartners at LHC and Future Colliders: Predictions from Constrained Compactified M-Theory

[1408.1959](#)

Leptophilic Dark Matter in Lepton Interactions at LEP and ILC

[1408.0728](#)

Can we reach the Zeptouniverse with rare K and B\_{s,d} decays?

1407.7021

Higgs Coupling Measurements and Direct Searches as Complementary Probes of the pMSSM

1407.5342

Singlet-Catalyzed Electroweak Phase Transitions and Precision Higgs Studies

1407.5283

Triple Higgs Coupling as a Probe of the Twin-Peak Scenario

1407.5056

Iron-free detectors for future linear colliders

1407.4609

Study of alternative ILC final focus optical configurations

1407.3792

The global electroweak fit at NNLO and prospects for the LHC and ILC

1407.3650

Photoproduction of the heavy quarkonium at the ILC

1407.2133

The Higgs boson and the International Linear Collider

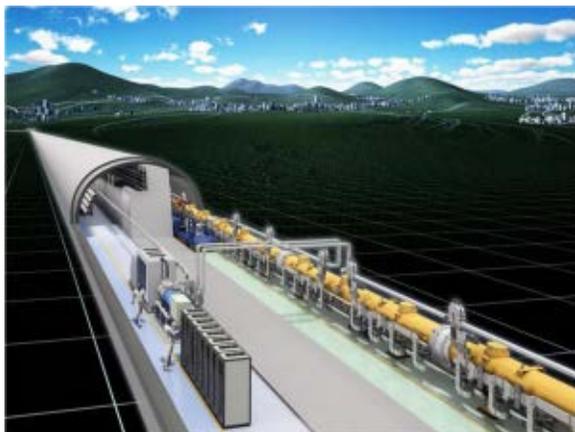
1407.1859

Singlet Majorana fermion dark matter: a comprehensive analysis in effective field theory

## FEATURE

# What does the P5 report mean for the International Linear Collider?

Joykrit Mitra | [21 August 2014](#)



*The planned International Linear Collider depicted in its expected home, the Japanese mountains. Image: Rey Hori (KEK)*

Since the last Particle Physics Project Prioritization Panel (P5) report in 2008, an even stronger case has emerged for building the long heralded International Linear Collider. The latest P5 report, released this year, recommends that the US Department of Energy and the National Science Foundation make provisions, among other things, for significant US participation in the ILC construction, should the project move forward.

P5 is an advisory panel that is periodically initiated by the Department of Energy's Office of High Energy Physics and the National Science Foundation. Although P5 has no final say in the allocation of funding, it represents the American particle physics community's viewpoint, and produces a report that is the culmination of a community driven process. It comprised well-known experts in the field, who sifted through the science and charted the field's priorities over the next 10 years, keeping in mind the overall progress the field hopes to make in the next two decades. It also streamlined the particle physics community's expectations according to fiscal

realities of varying abundance.

The panel was also advised by scientists involved in the ILC project, regarding the scale in terms of costs, manpower, technology and how it would all fit into a global high-energy physics research programme. After deliberation, it recommended support for the ILC on some level under all budgetary scenarios, as the physics case was extremely strong.

"Such a recommendation is a very important step because the ILC is a high-risk high-return project," said Dmitri Denisov, Americas region representative on the Linear Collider Physics and Detector's executive board. "It confirms there is really important physics to be done."

The report, published in May, comes as a coherent plan for American high-energy physics. Funding for high-energy physics had been shrinking for some time. Even though expectations were mixed, the 2014 P5 report has injected substantial optimism, both for national projects and international collaborations.

"I think the LHC has the highest priority in the report," said Harry Weerts, High Energy Physics Division director of Argonne National Laboratory and Americas regional director for the Linear Collider Collaboration. "But compared to 2008, the ILC is more recognised as a higher priority because we now know what the mass of the Higgs particle is."

In a field that is already quite global, the technical and fiscal scale of the ILC requires unprecedented global cooperation. It is projected to cost around 7.8 billion ILCU (2012 US Dollar) and is designed to be a staggering 31 kilometers long. The ILC's latest Technical

Design Report, which has been nearly 10 years in the making, was created by the world community of high-energy physicists. In Europe, many scientists are already working full time on research and development for the ILC. In the United States, there was a strong push for many years starting in the early 2000s, to host the ILC. But the Omnibus Spending Bill laid that to rest in 2008.

Currently, there are significant resources the United States can provide for the ILC. For instance, while Japan, as the most likely host country is expected to arrange for a significant portion of the infrastructure and funds, the accelerators—accounting for a large portion of the building cost— will require around two thousand accelerating cryo-modules. This is beyond the scope of a single nation to produce, and the United States already has the experience and infrastructure in place for producing at least a significant fraction of them.

A clear case for the ILC emerged after CERN's historic announcement on 4 July, 2012 of the Higgs discovery, and has grown even stronger since Japan took ensuing political steps to make the ILC happen. The lowest budgetary scenario recommends engaging personnel in R&D on the ILC accelerator and detectors for the next 3 years. The particle physics community recognises the imperative for US participation in this global project to maintain its leadership position in high-energy physics.

Meanwhile, in July, members of the Japanese [Diet](#) visited Washington to meet with members of Congress, and to be briefed by scientists. Once Japan green lights the ILC project, a formal collaboration will proceed. Enabling the U.S. to play a world leading role is a high-priority option.



*Members of the Japanese legislature in Washington after discussing the ILC. Image: Nanako Arai (KEK)*

[ILC](#) | [P5](#) | [P5 REPORT](#) | [UNITED STATES](#)

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# NEWSLINE

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## DIRECTOR'S CORNER

### Linear Collider School switches lakes

Brian Foster | [21 August 2014](#)

The great cathedrals of medieval Europe are often cited as the physical monuments to an Age of Faith; similarly, the mammoth particle accelerators of our day are sometimes said to be the parallel physical manifestations of our Age of Science. It is particularly appropriate therefore that this year's Linear Collider School was held in the Abbey of Frauenwörth. The abbey takes up a significant fraction of the area of the small island of Frauenchiemsee in the Chiemsee, a lake formed in southern Bavaria at the end of the last Ice Age. The abbey, which was founded by Duke Tassilo III of Bavaria in 772, is one of the oldest in Germany. This beautiful island, framed to the south by the beginnings of the Alps, played host last week to around 25 students and 19 lecturers who discussed the latest ideas and news on linear colliders and their place in our developing picture of particle physics.



*Participants of the linear collider school.*

The Linear Collider School is the latest in a series that for many years was held in North-West England, in another famous beauty spot, the Lake District. The guiding spirit of the school, Gudrid Mortgat-Pick, now at the University of Hamburg, was for many years a faculty member at the University of Durham, only about 100 kilometres east from the Lake District. Gudi, who is a native of Bavaria, had the idea to continue the Linear Collider School in her home state in similar surroundings and came upon the happy idea of basing it in one of the most famous beauty spots in Germany, Chiemsee. The old monastic buildings, crowned by an "onion" dome typical of Bavarian and Austrian church architecture, are large and magnificent. Although these buildings host a community of Benedictine nuns, there is ample space to let out bedrooms and meeting rooms to appropriate conferences. The bedrooms are completely unlike the monastic cells that the buildings originally contained; large and comfortable, they look out either onto the lake and the Alps or into a quiet interior courtyard. The peace of the setting is palpable and the venue offers an excellent place for both students and lecturers to concentrate on the latest developments in physics, detectors and accelerators related to linear colliders.

The school began on Monday afternoon with some general introductory lectures. Filip Moortgat of CERN gave a masterly overview of LHC physics, commenting on what LHC would be able to achieve in future running and what must be left for the ILC. I introduced the two linear collider machines, the ILC and CLIC, and described the various component parts of any linear collider while highlighting the differences between CLIC and the ILC. I concluded with the latest political developments and the possibility of Japan hosting the ILC. François Richard from Orsay looked back to the experience at LEP and drew lessons for the future; perhaps most importantly the difficulty of increasing the energy of a circular machine once the tunnel was constructed. This not only led to LEP just missing the discovery of the Higgs but also previously in the 1970s had led to the ADONE collider at Frascati just missing the discovery of the J/psi. The evening ended with more research; a trip to the island's brewery, which makes beer not only according to the traditional German "Reinheitsgebot", or purity law, but also uses only organic natural products. It was clear that several of our students began to think about switching fields when the Master Brewer told us that it was possible to obtain a doctorate in Beer Brewing!

On the following day the detailed work of the school began, covering the whole range of topics that can be explored at linear colliders

with both theoretical and experimental lectures. It was clear even from the sessions on Tuesday morning that linear colliders have a vital and extremely interesting programme of physics under any scenario of what the LHC might achieve in the next decades. Lecturers not only covered physics, but also accelerator topics, with Eckhard Elsen building on my introduction to cover the machine physics underlying linear colliders. Karsten Büßer discussed the detailed problems at the ILC of ensuring that the accelerator and detectors fit together in time and space in the optimal way to minimise interference and maximise physics reach. The unusually inclement weather meant that plans to spend the Wednesday afternoon excursion up a neighbouring mountain had to be cancelled in favour of an exploration of the much larger neighbouring island, Heerenchiemsee. This is famous for its remarkable palace, built by the famous “Mad King” Ludwig II. As pointed out by François Richard, its hall of mirrors emulates that of the palace of Versailles. The fact that the palace remained incomplete after the King’s death is a reminder that we need to start – and finish – the ILC soon!

Even half-way through the school, as I write, it is clear that it has been a great success. The peaceful surroundings were very conducive to concentration and discussion of physics while the nearby inns provided the possibility of continuing the discussions in convivial surroundings. Members of the organising committee will analyse the effectiveness of the conference and its future but it is already clear that the school has found a very suitable new home. It is hoped that the Linear Collider School will be held again in Chiemsee in the summer of 2016. I, for one, am hoping to receive an invitation to return and hope that many more students, and lecturers, will join us.

[CLIC](#) | [ILC](#) | [LEP](#) | [LHC PHYSICS](#) | [LINEAR COLLIDER SCHOOL](#)

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