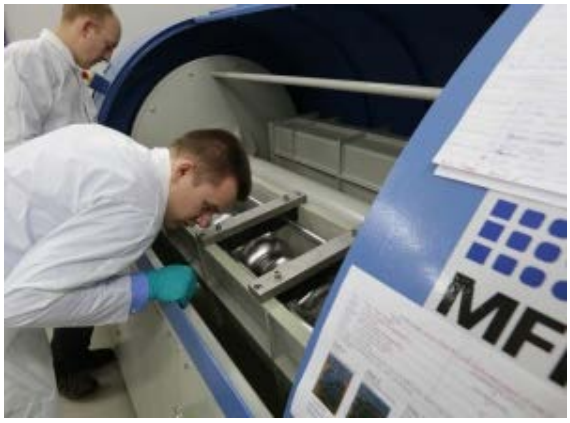
NEWSLINE
THE NEWSLETTER OF THE LINEAR COLLIDER COMMUNITY

AROUND THE WORLD



From *DESY inForm*: Accelerator – stonewashed

How cavities are refined in a type of tumbler

by Thomas Zoufal (DESY)

Usually it's basic research – especially for particle accelerators – that pioneers new technology. But in this case the researchers obviously had a little inspirational snoop at Levi's or any other jeans manufacturer's. Recently, DESY's superconducting TESLA cavities have started to be surface-treated with a stonewashing equipment – accelerators stonewashed, so to say.

AROUND THE WORLD

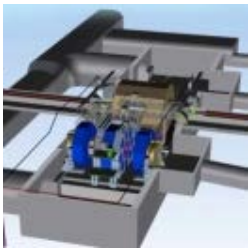
Former ILCSC chair Jon Bagger to lead TRIUMF

Jonathan Bagger, ILCSC chair until its final meeting a year ago and current member of the Linear Collider Board, will take over as Director of the Canadian national lab TRIUMF from July 2014, TRIUMF announced on Tuesday. "It is an exciting time to lead the laboratory," Bagger, currently of Johns Hopkins University, said. "Its collaborative, interdisciplinary model represents the future for much of science. TRIUMF helps Canada connect fundamental research to important societal goals, ranging from health and safety to education and innovation."

DIRECTOR'S CORNER

Physics and detector organisation – Progressing on delicate balances

by Hitoshi Yamamoto



Without a solid physics case, state-of-the-art detectors and well-defined infrastructures like computing and links with the machine, a linear collider would have few arguments to go by. The Linear Collider Collaboration has working groups installed that make sure that the detectors can advance towards real collaborations and that synergies between the two linear colliders are harnessed as much as possible. Hitoshi Yamamoto, Associate Director for Physics and Detectors in the LCC, describes the current status of the physics and detector directorate where most of the components are now up and running.

IN THE NEWS

from *CBS8.com*
18 March 2014
Johns Hopkins University Scientist to Lead Canadian National Laboratory
Next Director of TRIUMF Brings Global Experience

from *Iwate Nippo*
15 March 2014
出前授業の講師養成 奥州市　5月開始に向け講座
奥州市は　日、同市水沢区の奥州宇宙遊学館で、　年度から行う国際リニアコライダー　出前授業の講師養成講座を開き、東北大大学院理学研究科の石川明正助教が講演した。(Oshu city held the lecture by Akimasa Ishikawa, a physicist at Tohoku University, as a training for the lecturers who will give the talk about ILC at the city's junior high school)

from *Yomiuri Shimbun*
15 March 2014
県復興局長に中村氏、秘書広報室長に東大野氏
組織改編では、素粒子物理学の巨大実験施設「国際リニアコライダーの県内誘致を担う「科学　推進室」を政策地域部に新設する。 Iwate prefecture announced the organization change, and newly established the science and ILC promotion office" responsible for the activities to invite the ILC to the region)

from *Financial Times*
14 March 2014
When hadrons collide: Cern plans an upgrade
If you want to know what long-term planning means, look no further than high-energy physics.

from *Iwate Nippo*
14 March 2014
誘致へ特別委を設置 一関市議会、4月に初会合
一関市議会は　日、国際リニアコライダー　の誘致実現と環境整備に向けて、　誘致・学術研究都市づくり調査特別委員会を設置した。(Ichinoseki city council established the special committee toward the invitation of the ILC and environment preparation

from *science actualités.fr*
7 March 2014
À quoi ressemblera le futur LHC ?
L'ILC est-il vraiment un concurrent de FCC ? Pas sûr… Dans la partie de poker qui se joue sur la scène mondiale, l'Europe et le Cern pourraient soutenir le projet japonais d'accélérateur linéaire, nettement plus avancé en terme de design et de conception… Abandonnant, au passage, leur propre projet similaire, baptisé CLIC (Compact Linear Collider Project).(…) Parions que le futur collisionneur circulaire ne connaîtra pas le même sort, tant la communauté internationale des physiciens semble, cette fois, mobilisée pour cet objectif.

from *Tech World*
6 March 2014
Cern bygger 10 mil lång partikelaccelerator
Lite närmare i tiden ligger International Linear Collider, som kommer att krocka elektroner istället för protoner och undersöka mörk energi och multipla dimensioner. Landet som kommer att bygga ILC är ännu inte klart, men den beräknas stå klar 2026.

ANNOUNCEMENTS

2014 Asia-Europe-Pacific School of High-Energy Physics

The **2014 Asia-Europe-Pacific School of High-Energy Physics** will be held in Puri, India, from 4 to 17 November 2014. The deadline for applications is 11 April 2014. AEPSHEP is held every second year, hosted in countries in the Asia-Pacific region. The first School in the series was held

PREPRINTS

ARXIV PREPRINTS

1403.4262
Electroweak Symmetry Breaking by QCD

1403.3292
Proceedings of ECLOUD'12: Joint INFN-CERN-EuCARD-AccNet Workshop on Electron-Cloud Effects, La Biodola, Isola

in Fukuoka, Japan in 2012.
…Read more

CALENDAR

Upcoming events

CALICE collaboration meeting
Argonne, Chicago, IL
19- 21 March 2014

Americas Workshop on Linear Colliders (AWLC14)
Fermilab
12- 16 May 2014

View complete calendar

d'Elba, Italy, 5 – 9 Jun 2012

1403.2893
Present and future constraints on top EW couplings

1403.2383
Characterizing New Physics with Polarized Beams at High-Energy Hadron Colliders

1403.2046
On the ratio of ttbb and ttjj cross sections at the CERN Large Hadron Collider

1403.1582
Probing the Standard Model with Higgs signal rates from the Tevatron, the LHC and a future ILC

1403.1264
Benchmarks for Higgs Pair Production and Heavy Higgs Searches in the Two-Higgs-Doublet Model of Type II

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From *DESY inForm*: Accelerator – stonewashed

How cavities are refined in a type of tumbler

Thomas Zoufal (DESY) | 20 March 2014

Using different polishing materials, ranging from centimetres to millimetres in size, the cavities are refined in a type of tumbler. Images: DESY/Dirk Nölle

Usually it's basic research – especially for particle accelerators – that pioneers new technology. But in this case the researchers obviously had a little inspirational snoop at Levi's or any other jeans manufacturer's. Recently, DESY's superconducting TESLA cavities have started to be surface-treated with a stonewashing equipment – accelerators stonewashed, so to say.

While jeans are only stonewashed for show, there is a fundamental scientific background to do this with the 9-cell cavities: in order to reach highest accelerating fields, the inside of the cavities must be as smooth as a mirror. One way to achieve this is to repeatedly polish the interior of the cavities. This treatment is now systematically tested by the ILC HiGrade group. "We want to reach gradients of 35 megavolts per metre and more for the ILC. This requires a surface that is very clean and smooth up to a few nanometres," said Aliaksandr Navitski, who conducts the testing. For their experiments, the team from of DESY and the University of Hamburg uses a number of cavities especially manufactured for these tests, parallel to the current production of European XFEL cavities.

The stonewashing treatment has four stages. The cavities are filled with different polishing granules and rotate on two axes – a bit like the Earth rotating around the Sun and also around itself – for hours in a type of cement mixer. The first filling, a mixture of stones and water, eliminates impurities that develop mainly locally in the region of the weld of the individual half cells. It removes ten micrometres per hour from the surface. After eight hours, the mixture is exchanged: fine stone granules melted into synthetic material provide an increased degree of fineness. The fine sanding is achieved in the final two stages of stonewashing: the cavity is filled with small hardwood blocks and fine-grained aluminium oxide and water, and in the last stage with colloidal silicon oxide, and mixed for 30 to 40 hours before the highly polished cavity is finished.

Not as sweet as they look: these granules polish cavities to extremely high degrees.

"Polishing the inside of a cavity with a mixing machine had already been done at DESY in the 80's for one-cell PETRA cavities," said Eckhard Elsen from the FLA group. "However, our current experiments with 9-cell cavities are mainly based on the experience of Fermilab, Jefferson Lab and Japanese colleagues."

For now, after each "wash cycle", the cavities are precisely measured in the ILC HiGrade laboratory. "We want to analyse the systematics of stonewashing," said Navitski. "The evenly distributed filling of the cavity with the appropriate mixture of abrasives and

liquid is as important as the tumbling time at each polishing stage." For the construction of the ILC, this technology could replace the currently used method of electropolishing with fluoric acid. This would not only mean getting rid of the undesirable acid: "The mechanical polishing has the advantage of removing residuals of other metals, e.g. aluminium. This is not possible with electropolishing," said Navitski.

This article first appeared in DESY inForm.

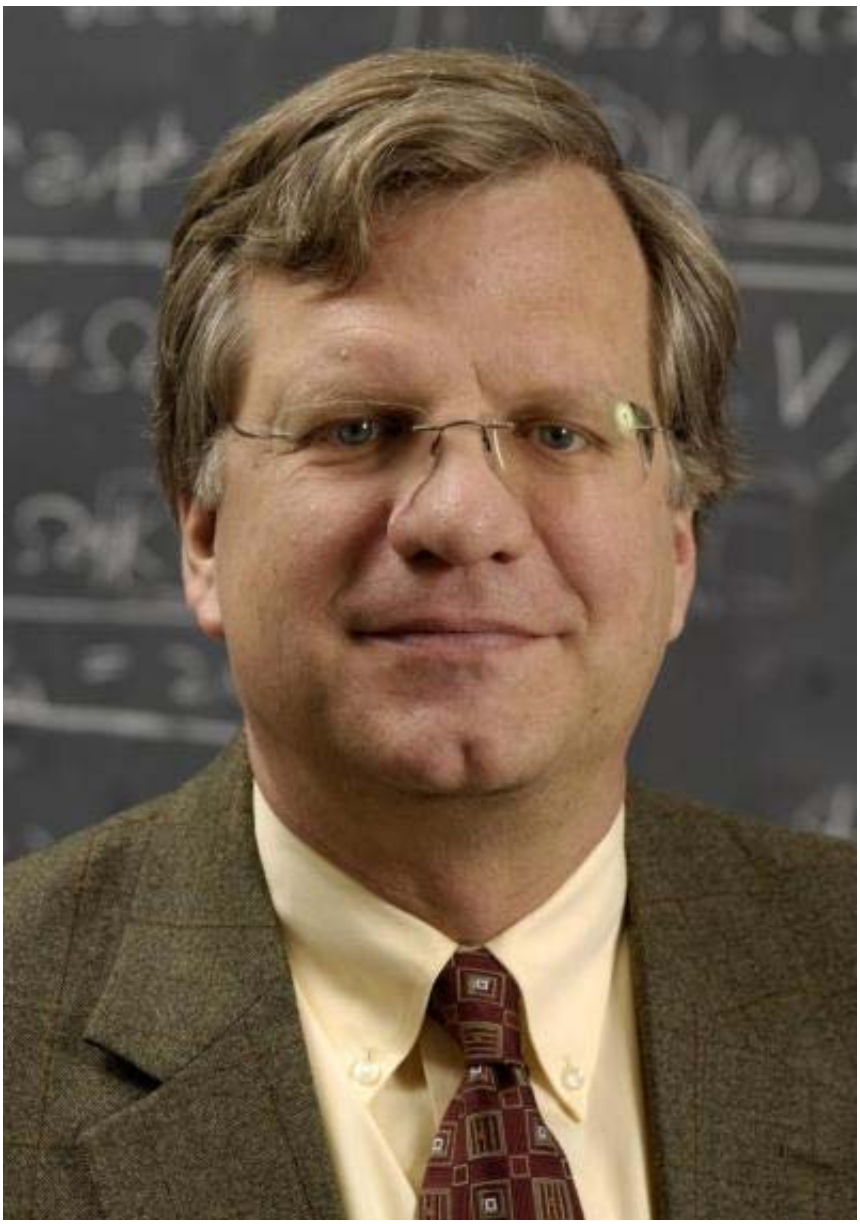
ACCELERATOR R&D | CAVITY GRADIENT | DESY | EUROPEAN XFEL | SUPERCONDUCTING CAVITY

Johns Hopkins Scientist to Lead TRIUMF

18 March 2014

Johns Hopkins University Scientist to Lead Canadian National Laboratory

Next Director of TRIUMF Brings Global Experience



(Vancouver, BC) – After a seven month, highly competitive, international search for TRIUMF's next director, the laboratory's Board of Management announced today that Dr. Jonathan Bagger, Krieger-Eisenhower Professor, Vice Provost, and former Interim Provost at the Johns Hopkins University, will join TRIUMF this summer as the laboratory's next director.

TRIUMF is Canada's national laboratory for particle and nuclear physics, focusing on probing the structure and origins of matter and advancing isotopes for science and medicine. Located on the campus of the University of British Columbia, TRIUMF is owned and operated by a consortium of 18 leading Canadian universities and supported by the federal and provincial governments.

Bagger was attracted to TRIUMF because, "Its collaborative, interdisciplinary model represents the future for much of science. TRIUMF helps Canada connect fundamental research to important societal goals, ranging from health and safety to education and innovation." Noting TRIUMF's new strategic plan that recently secured five years of core funding from the Government of Canada, he added, "It is an exciting time to lead the laboratory."

Bagger brings extensive experience to the job. Professor Paul Young, Chair of TRIUMF's Board of Management and Vice-President of Research and Innovation at the University of Toronto, said, "Jon is an outstanding, internationally renowned physicist with a wealth of leadership experience and a track record of excellence. He is a welcome addition to Canada and I am confident that under his tenure, TRIUMF will continue to flourish."

Jim Hanlon, Interim CEO/Chief Administrator Officer of TRIUMF and President and CEO of Advanced Applied Physics Solutions Inc., welcomed the news. He said, "The laboratory has been shaped and served greatly by its past directors.

Today the need continues for an extraordinary combination of vision, leadership, and excellence. Jon will bring all of this and more to TRIUMF. On behalf of the staff, we're excited about moving forward with Jon at the helm."

Bagger expressed his enthusiasm in moving across the border to join TRIUMF as the next director. "TRIUMF is known internationally for its impressive capabilities in science and engineering, ranging from rare-isotope studies on its Vancouver campus to its essential contributions to the Higgs boson discovery at CERN. All rest on the legendary dedication and commitment of TRIUMF's researchers and staff. I look forward to working with this terrific team to advance innovation and discovery in Vancouver, in Canada, and on the international stage."

Bagger will lead the laboratory for a six-year term beginning July 1. He reports he is ready to go: "I have installed a metric speedometer in my car, downloaded the Air Canada app, and cleansed my home of all Washington Capitals gear."

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About Jonathan A. Bagger

Jonathan A. Bagger was appointed Vice Provost for Graduate and Postdoctoral Programs at Johns Hopkins University on March 1, 2008. A faculty member since 1989, he spends a third of his time as Krieger-Eisenhower Professor of Physics and Astronomy in the university's Krieger School of Arts and Sciences. He served as the university's Interim Provost and Senior Vice President for Academic Affairs from 2012 to 2013.

Bagger's research centers on high-energy physics at the interface of theory and experiment. Together with Julius Wess, he is the author of the monograph *Supersymmetry and Supergravity*. Dr. Bagger has twice been a member of the Institute for Advanced Study. He served as chair of the International Linear Collider Steering Committee, as vice chair of the U.S. Department of Energy/National Science Foundation High Energy Physics Advisory Panel, and as a member of the U.S. National Research Council's Board on Physics and Astronomy. He has served on the Fermilab Board of Overseers, the SLAC Scientific Policy Committee, the Space Telescope Institute Council, and the Board of Directors of the National Space Biomedical Research Institute. He is a fellow of the American Physical Society and the American Association for the Advancement of Science.

Bagger graduated from Dartmouth College in 1977. After a year at the University of Cambridge as a Churchill Scholar, he continued his graduate study at Princeton University. He received his Ph.D. in 1983 and took a postdoctoral research position at the Stanford Linear Accelerator Center. From 1986 to 1989, he was Associate Professor at Harvard University.

–Taken from a TRIUMF Press Release.

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DIRECTOR'S CORNER

Physics and detector organisation – Progressing on delicate balances

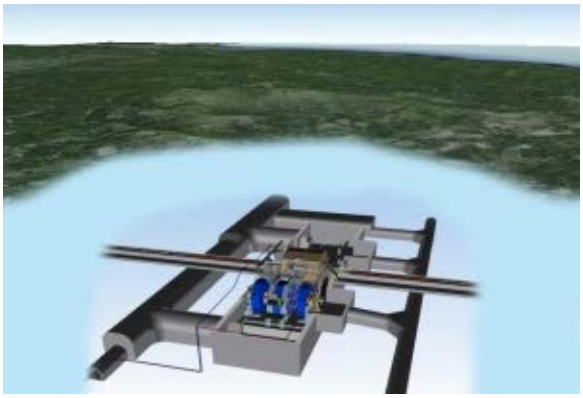
Hitoshi Yamamoto | 20 March 2014

In the charge drafted by the ILCSC nearly two years ago, the responsibility of the associate director for physics and detectors of the Linear Collider Collaboration (LCC) was stated as follows:

"He/she will coordinate the world-wide effort to develop advanced detectors that are appropriate for either accelerator technology… Initially, the Associate Director will focus on

- Building the physics case for a linear collider;
- Coordinating R&D on advanced detector technologies;
- Developing validated detector concepts for both accelerator technologies."

Here, 'both accelerator technologies' of course mean the ILC and the CLIC. The situation, however, has changed dramatically since the charge was drafted due to the positive developments for the ILC. The main goal of the LCC now is to realise the ILC, and accordingly the last of the three goals above should be updated to say 'Preparing the way for collaboration formation and detector construction of the ILC while promoting synergy between ILC and CLIC detector activities'. The LCC physics and detector directorate will define benchmarks and review the progress of the ILC detector activities, but it will not do the same for the CLIC detector activities that have a different time scale and urgency.



Artist's impression of two detectors in push-pull configuration under the Kitakami mountains

The executive board is the core group of the LCC physics and detector directorate. All key decisions within the LCC physics and detector directorate will be made by this group. Apart from the associate director, it consists of representatives from the detector groups, conveners of working groups and regional contacts. Currently, the working groups are physics, detector R&D, machine-detector interface, software and computing and ILC parameters. Additional working groups may be added as needed. Let me briefly describe highlights of these working groups.

The machine-detector interface working group, led by Karsten Büßer, coordinates the activities such as the design of the detector hall and the integration of detectors within it. Currently, the group's focus is on site-specific studies for the Kitakami site.

The detector R&D liaison, led by Maksym Titov, keeps track of detector R&D efforts relevant to linear colliders. Detector R&D groups are mostly highly independent groups with their own funds, and they do not wish to be controlled or even coordinated by a higher organisation. After intensive discussions with key R&D groups, we have agreed to have

one liaison and a deputy. They are now compiling all the detector R&D efforts related to linear colliders so that new comers can identify areas they might be able to contribute.

The software and computing working group, led by Norman Graf, coordinates software tools common to detector groups, and evaluates computing needs. They are now figuring out the profile of computing needs from now up to the real experiments. Such information is needed for the design of the central campus.

The ILC parameters working group is a joint working group of the ILC accelerator group and the ILC physics and detector group, led by Jim Brau and Nick Walker. This working group is specific to the ILC, and the immediate goal is to provide information for the initial staging scenario of the ILC.

The conveners of the physics working group will soon be selected. The physics working group is the central body in formulating the physics case for the linear collider and its implications, and the deputy director of the LCC sits as an observer.

Independently of the executive board, there exists the physics and detector advisory panel that reports directly to the associate director. The chair is defined to be Paul Grannis; the panel itself, however, is now under construction, and I would like to talk about it in the near future. At a certain point in near future, there will be a review on the progress of the ILC detector groups towards real collaborations, and this panel will be the body to execute such a review. It will also look at the synergy between the ILC and CLIC detector efforts.

Most of the working groups described above have representatives from the CLIC detector and physics group, and the executive board includes a member representing them also. This is simply a manifestation of close collaborations at many levels between the two communities, and the LCC physics and detector directorate will encourage and promote such collaborations. One of the most important goals of the LCC physics and detector directorate is to keep the linear collider communities together.