Memories of Dr. Perret-Gallix at CERN and KEK

Takayuki Saeki (KEK)

Dr. Denis Perret-Gallix Memorial Symposium

02 April 2019

KEK

CERN(セルン研究所）

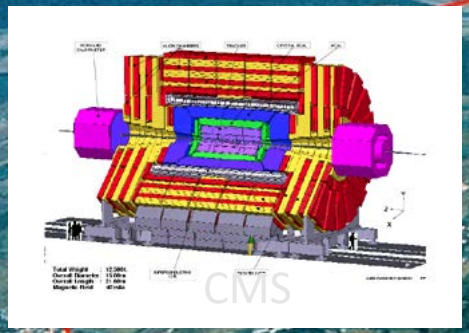
LHC

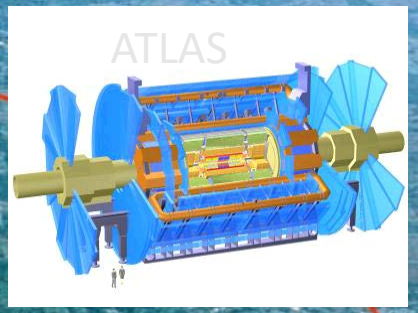
(Large Hadron Collider)

世界最大の加速器

Currently, LHC is running at CERN.

現在、CERNではLHCが稼働している。

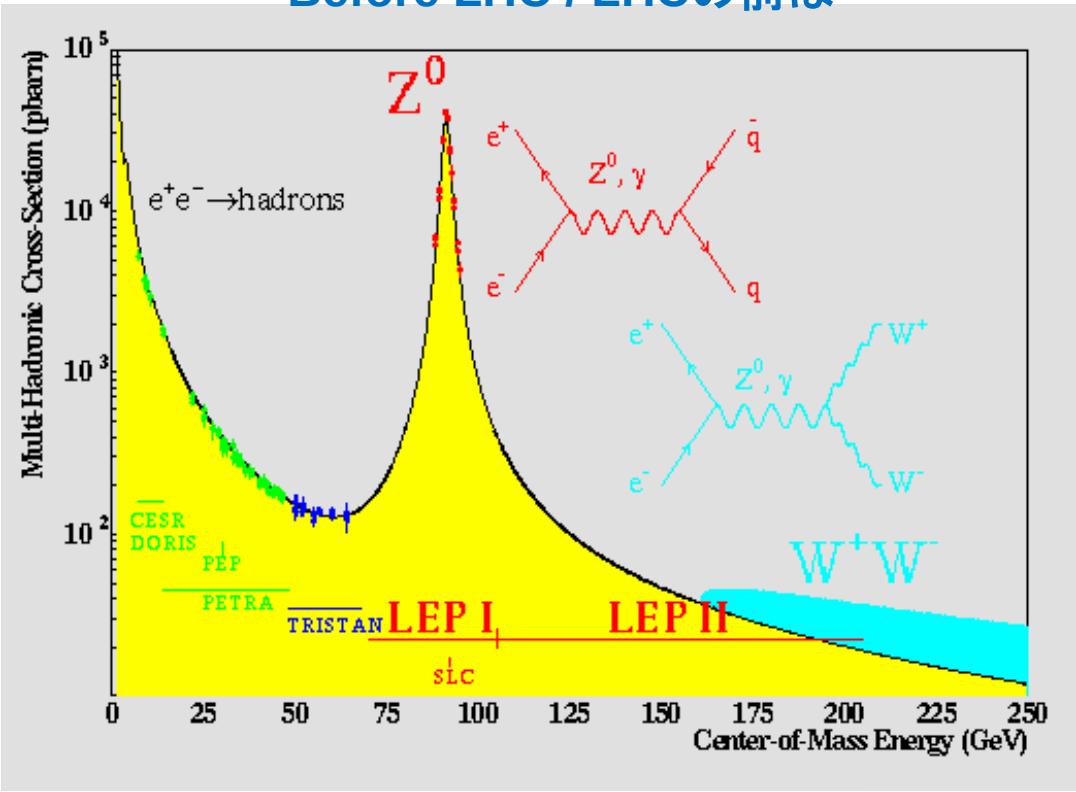




Circumferential length: 27 km

周長約27km(JR山手線の大きさ）

Before LHC / LHCの前は



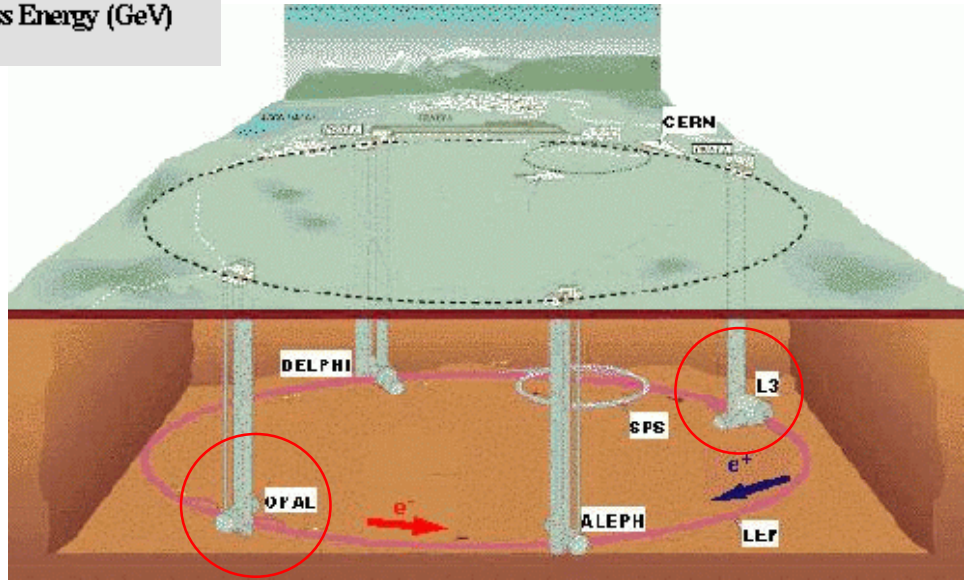
LEP experiments
LEP 実験

I was working for OPAL experiment at LEP during 1996 – 2004.
私は、1996年ー2004年の間、LEPのOPAL実験に参加していました。

Dr. Perret-Gallix was working for L3 experiment in this period.
Dr. Perret-Gallilx さんは、このころ、L3実験に参加していました。

The largest electron-positron collider in the world is the LEP at CERN in Europe. This collider has the circumferential length of 27 km. It was operated during 1989 – 2000.

これまで世界最大の電子・陽電子加速器は、欧州のCERN研究所にあったLEPと呼ばれる加速器です。この加速器は円形で、その周長は27kmに及び、1989年 - 2000年に運転されました。



I met Dr. Denis Perret-Gallix for the first time in QFTHP97 in Samara, Russia in 1997.
私は、Dr. Denis Perret-Gallix に、1997年にロシアのサマラで開催されたQFTHP97で出会った。これが最初の出会いでした。

Still the WS page is there!
まだWSのページが残っていました！

QFTHEP'97

XII International Workshop on High Energy Physics and Quantum Field Theory

Samara , Russia, 4 - 10 September, 1997

Organizers:

Institute of Nuclear Physics of Moscow State University

Samara State University

Education Management of Samara Region Administration

Program | **Contributions and Proceedings** | Advisory Committee | Organizing Committee | Travel information | Participation fee | Social program | Deadline | Contact Info | On-Line Registration

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Information bulletin #2 .

Updated Scientific Program : PS file , LaTeX file .

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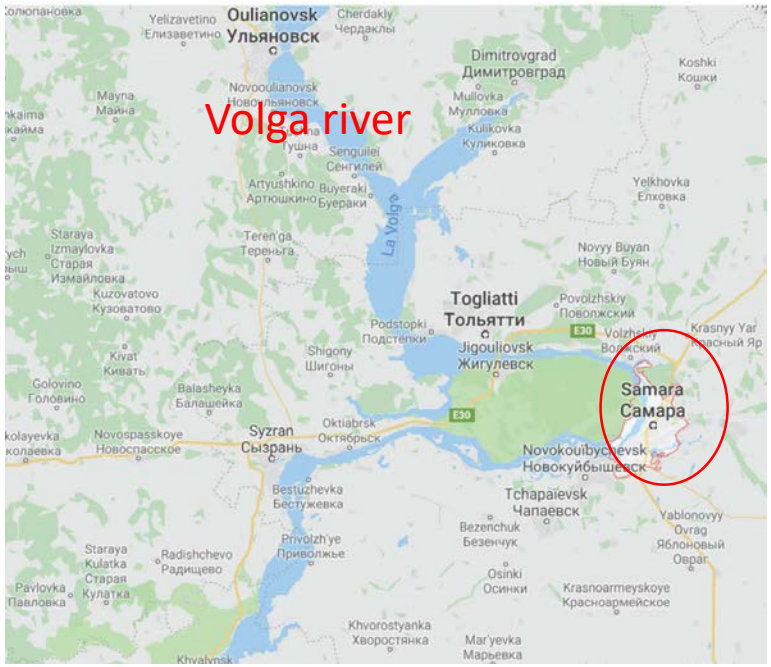
poster : grayscale 2*A4, .ps.gz file, 399 Kb

INFORMATION BULLETIN No.1

Samara in Russia / ロシアのサマラ



Social program

The Organizing Committee is planning to arrange a sightseeing of Samara, visits to the museums, theatres, etc. and to the famous sites in the countryside for extra charge. A special social program for the accompanying persons can also be organized.

There was a boat-tour on the Volga river. We talked about physics of LEP in the tour.
ボルガ川のボートツアーがあった。そのツアーで、私たちはLEPの物理について語り合いました。

arXiv:hep-ex/0612034v2 12 Feb 2007

EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

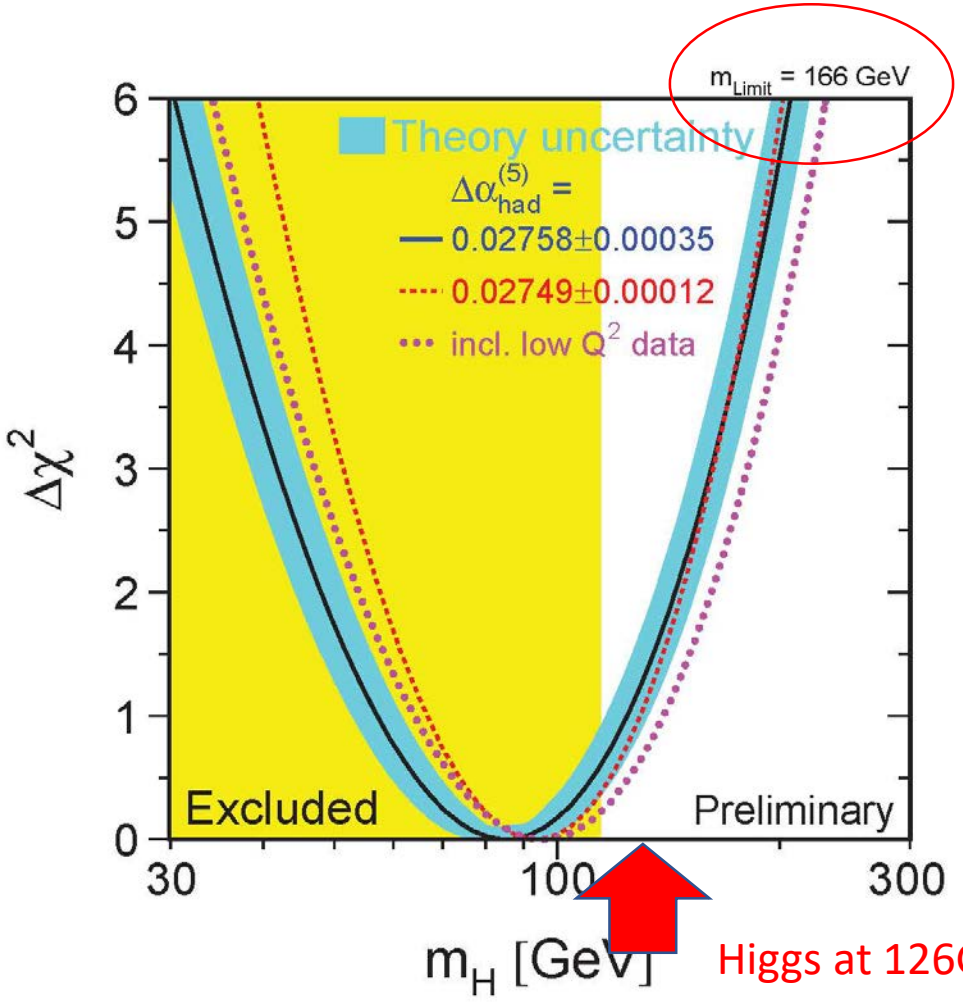
CERN-PH-EP/2006-042
LEPEWWG/2006-01
ALEPH 2006-001 PHYSICS 2006-001
DELPHI 2006-014 PHYS 948
L3 Note 2833
OPAL PR 419
hep-ex/0612034
14 December 2006

A Combination of Preliminary Electroweak Measurements and Constraints on the Standard Model

The LEP Collaborations[1] ALEPH, DELPHI, L3, OPAL, and the LEP Electroweak Working Group[2]

Prepared from Contributions of the LEP Experiments to the 2006 Summer Conferences.

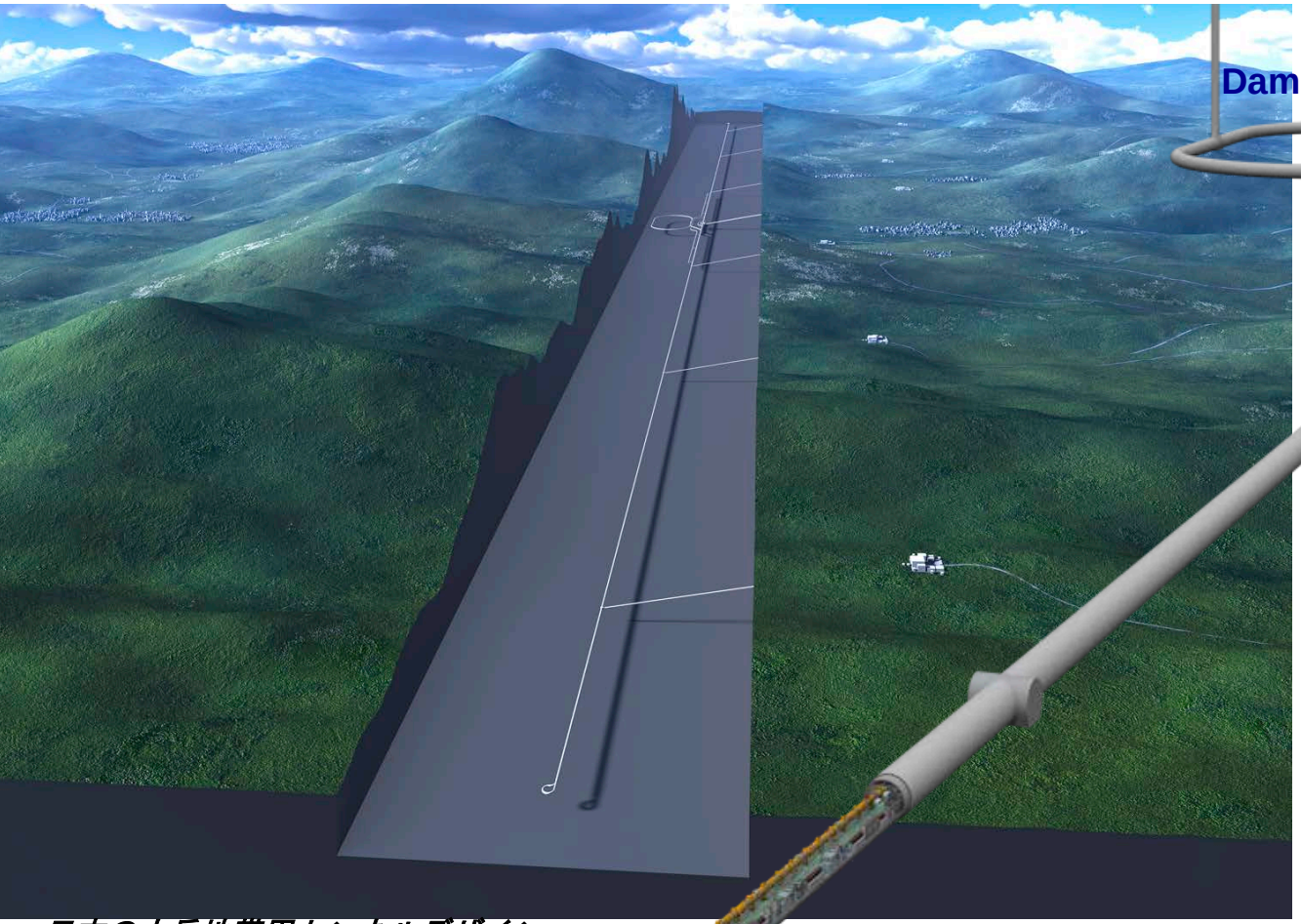
4 experiments of LEP (ALEPH, DELPHI, L3, OPAL) combined data to limit the Higgs mass after finishing the run 2000.
LEP の4つの実験グループ（ ALEPH, DELPHI, L3, OPAL ）は、2000年の最終運転の後で、データを合わせてヒッグスの質量に制限を与えました。



We were involved in such works.
我々は、このような仕事をしていました。

We could not find the Higgs at LEP. Later, Higgs was found by LHC at the mass of 126 GeV in 2012.
我々はLEPでヒッグスを見つけることはできませんでした。ヒッグスは、のちの2012年にLHCで126 Gevの質量の粒子として発見されました。

International Linear Collider (ILC) / 国際リニアコライダー



日本の山岳地帯用トンネルデザイン

I moved to KEK in 2004 to study about the accelerator of ILC.
私は、2004年にILCの加速器を研究するためにKEKに移りました。

Colliding Energy / 衝突エネルギー : 250 GeV + 250 GeV
Tunnel length / トンネル長: ～30 km

Technical Design Report of ILC / リニアコライダーの技術設計書

2007

2011

2013*

Completion of the TDR
技術設計書の完成

TDR Part I:
R&D

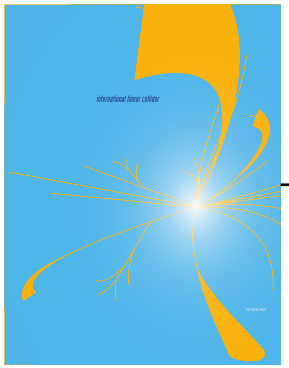
~250 pages
Deliverable 2

TDR Part II:
Baseline
Reference
Report

~300 pages
Deliverables
1,3 and 4

AD&I

参考設計書



Reference
Design Report

ILC Technical
Progress Report
(“*interim report*”)

中間設計書

Technical Design Report (TDR)
リニアコライダーの技術設計書

* end of 2012 – formal publication early 2013

I joined TYL collaboration in 2008 for the first time. And I met Dr. Perret Gallix again.
私は、2008年に日仏共同研究に参加しました。そして、Dr. Perret-Gallix に再会したのでした。

A RD 05:

SURFACE PREPARATION

STUDIES

FOR SUPERCONDUCTIVE CAVITIES

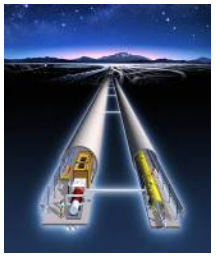
Irfu
Institut de Recherche sur les lois fondamentales de l'Univers
saclay

KEK

F. Eozénou, T. Saeki

TWO MAIN ROJECTS RELATED TO THE “COLD” TECHNOLOGY

- International Linear Collider
  - ~17000 Superconductive Nb cavities > 31.5 MV/m
  - 1 Tev



- XFEL (X-Ray Free-Electron Laser)
  - 17.5 GeV λ=0.1nm
  - 808 cavities E=23.5 MV/m assembled in 101 cryomodules

Building of Clean Room at Saclay in Progress.

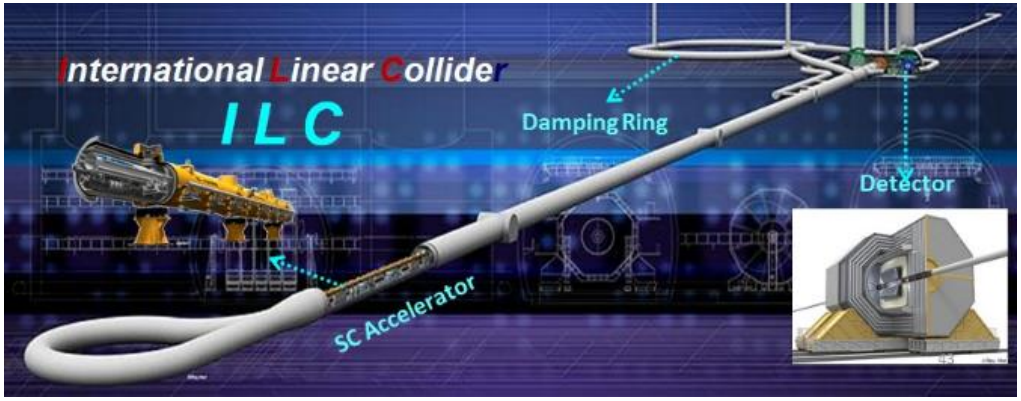
ILC needs green technology
ILCにはグリーンな技術が必要

ILC design for more efficient energy consumption (in accelerator operation)

We need Green ILC

to have the green sign for ILC !

Serious issue for the realization of ILC

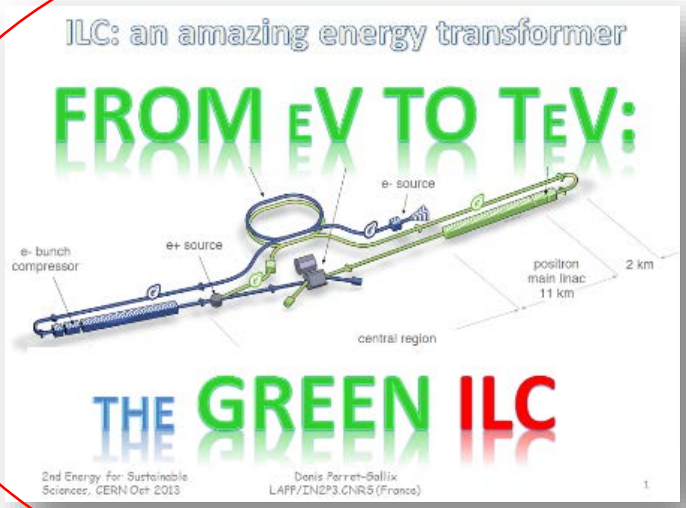


Slide by Prof. A. Suzuki

2nd ESS WS (Oct. 2013) triggered the Green-ILC activities !

2nd Workshop
Energy for Sustainable Science
at Research Infrastructures

CERN, GENEVA, SWITZERLAND, 23-25 OCTOBER 2013



Energy Management in Japan, Consequences for Research Infrastructures

Masakazu Yoshioka (KEK)

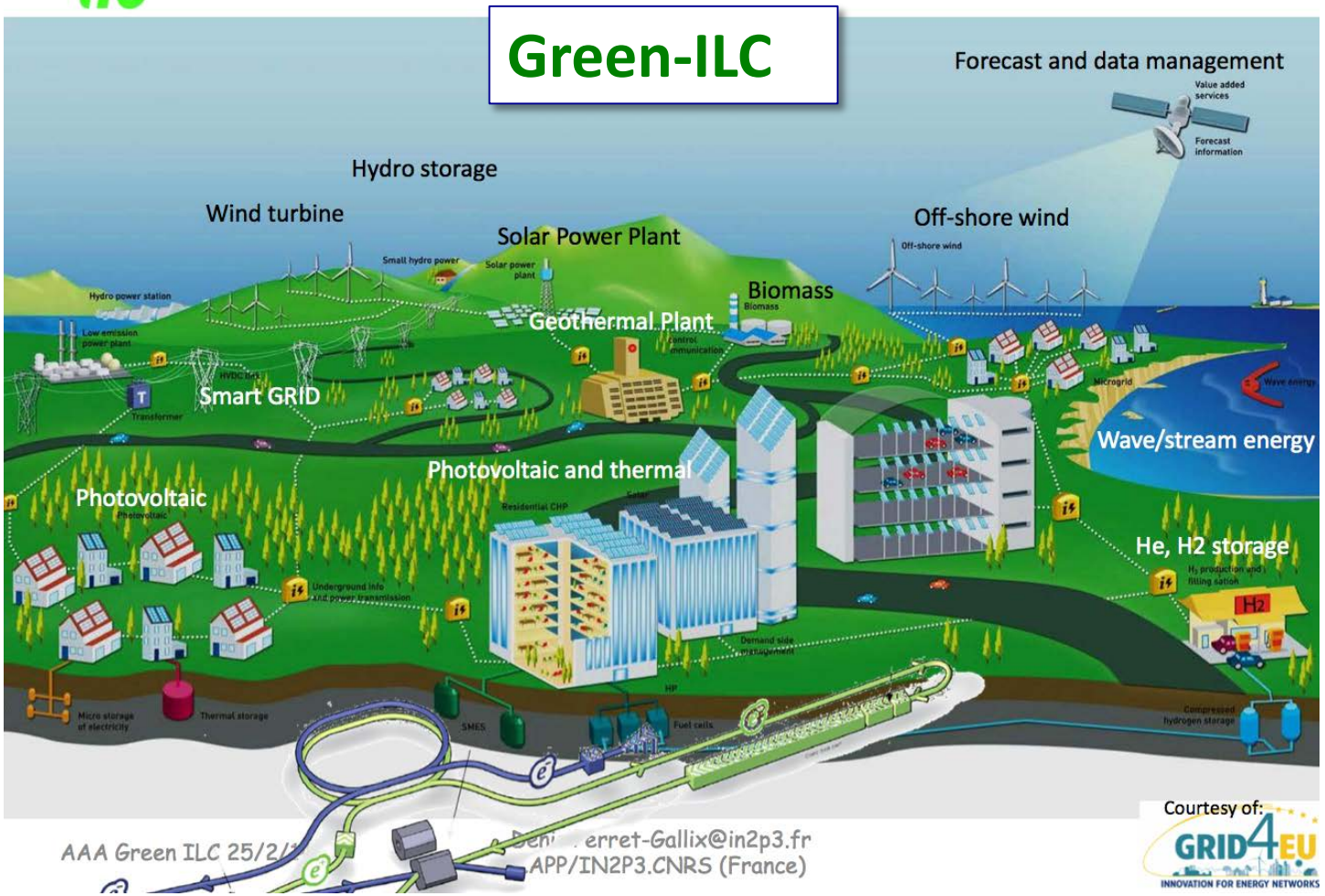
1. Electric power supply in Japan, before and after March 11, 2011 earthquake
   - High efficiency and "almost" environmental pollution-free electricity generators can save Japan, and contribute to reduce global CO_2 problem
2. KEK Electricity contract as an example of large-scale RIs
3. Accelerator design by considering optimization of luminosity/electricity demand
   - Example: Super-KEKB
   - ILC
4. Accelerator component design by considering high power-efficiency
   - Klystron
   - Availability based on MTBF and MTTR
5. Summary

Energy Management at KEK, Strategy on Energy Management, Efficiency, Sustainability

Atsuto Suzuki (KEK)

INTER-UNIVERSITY RESEARCH INSTITUTE CORPORATION
HIGH ENERGY ACCELERATOR RESEARCH ORGANIZATION

ILC center futuristic view

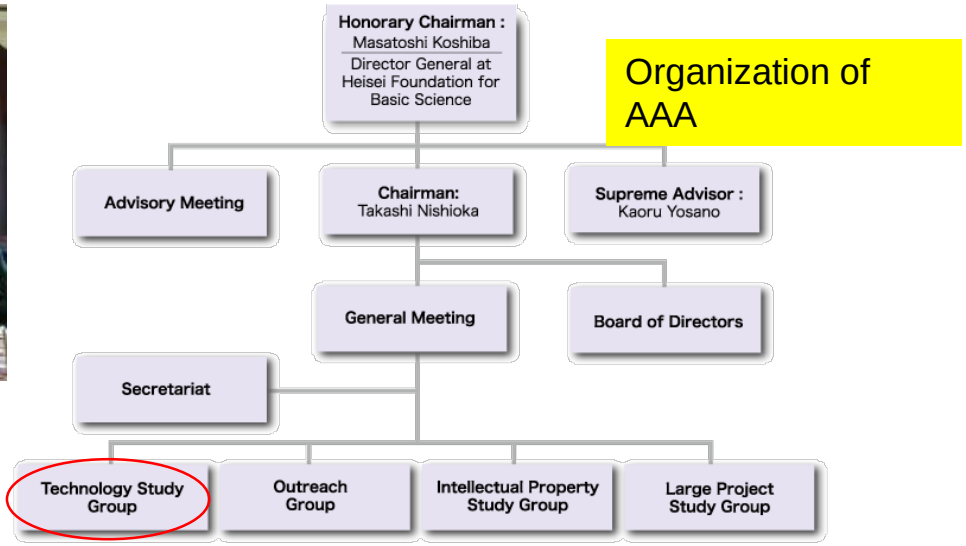


This famous Green-ILC slide was made by Dr. Perret-Gallix.
この有名なグリーンILCのスライドは、Dr. Perret-Gallix によってつくられました。

Advanced Accelerator Association promoting science & technology (AAA) in Japan

Association by industries and scientists established in 2008

- 112 corporate organizations involved from industries （MHI, Toshiba, Hitachi, Mitsubishi Electric, etc.) as of Nov. 2017.
- 42 institutional organizations involved from universities and laboratories （KEK, Univ. of Tokyo, Univ. of Tohoku, Univ. of Kyoto, Riken, etc.) as of Nov. 2017.



Green-ILC WG started in Technology Study Group on 25th Feb. 2014.

I am the organizer of Green-ILC WS and Dr. Perret-Gallix was the bridge to the world-wide Green-Acc activities.
私はこのグリーンILC-WGを主宰し、Dr. Perret-Gallix は世界のグリーン加速器の活動への橋渡しをしてくれました。

Green ILC

Energy for Innovation, Innovation in Energy

http://green-ILC.in2p3.fr

Home | Blog | Archives | ▸ Research | Conferences | Documents | Links | Contacts | Search | RSS

The Green ILC Project

ILC, the International Linear Collider, is the next fundamental science project in high energy physics and the first ever true global basic science center.

What CERN did for the European HEP community, ILC will do for the world. But the e+e- ILC project may go even beyond mere fundamental science and contribute to one of the world most pregnant issue: Energy, not merely high-energy but, more generally: energy for the society.

Artistic view of the ILC center in Kitakami (Japan) ILC-Iwate

The ILC scientific goal is simple: high precision study of the Higgs particle recently discovered at LHC (CERN) and other signals LHC could possibly single out. New effects will also be searched for, effects which could have been missed by the LHC due to the heavy background. Higher precision here concerns, more particularly, the various Higgs couplings, limited at LHC, in part, by the complex structure of the interacting particles, the protons compared to the elementary electrons.

Recent Posts

Green-ILC in LC Newsline
New Hydraulic Wind Turbine
Green Session at LCWS 2014
EUCARD2 EnEfficient
Liquid Air in the Energy and Transport Systems

Links

email: green.accelerators@gmail.com
Green-ILC wiki
Green-ILC group discussion

Green-ILC WG (AAA) report-2016 in English and all presentations related to Green-ILC are found on http://green-ILC.in2p3.fr/documents/.

Dr. Perret-Gallix made and organized the Green-ILC web page.
Dr. Perret-Gallix はグリーンILCのウェブページを作成し運営していました。

International Panel on "Sustainable colliders and accelerators"

ICFA: International Committee on Future Accelerators
has setup a panel: ~ 20 people headed by Mike Seidel (PSI, Switzerland)

Dr. Denis Perret-Gallix, and me

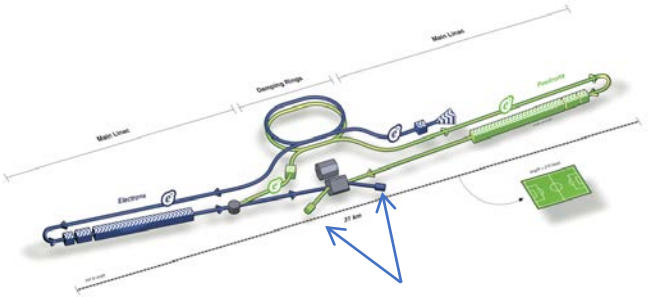
- strategy & coordination
- energy efficient accelerator concept
- energy efficient and sustainable accelerator technology
- energy management for large research facilities

Also providing close and active communication among various projects.

R&D on Plasma Beam Dump

- Beam dump
- 14 MW (1TeV) @5 hertz
- 10 m Water 155°C, 1000m gas

Wakefield deceleration for beam dump project



Main Beam dumps
10m water, or1000m gas

Study on the International Linear Collider Beam Dump by plasma-wakefield deceleration

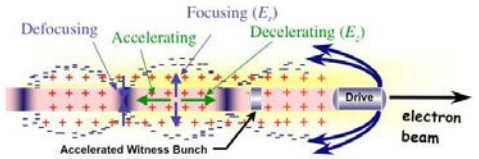
T. Saeki, J. Fujimoto, H. Hayano, K. Yokoya (KEK/Sokendai)
T. Tajima, D. Farinella, X. Zhang (University of California at Irvine)
M. Zeng (ELI-NP, Romania)
A. W. Chao (SLAC)
D. Perret-Gallix (LAPP/IN2P3 – KEK)

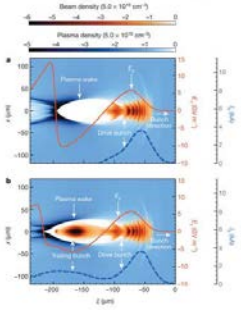
1st Nov. 2016
Academia meets industry forum
IEEE-NSS/MIC
Strasbour, France

1

Inter-University Research Institute Corporation High Energy Accelerator Research Organization
高エネルギー加速器研究機構
KEK
2016/10/30

Plasma Acceleration, wakefield acceleration





Slide by Dr. Perret-Gallix.
Dr. Perret-Gallix のスライド

R&D on Plasma Beam Dump

- Collective deceleration dump
  (1) No dump window problem
  (2) No hydrogen gas production problem
  (3) Less radioactivation
  (4) Compact facility
  (5) Energy might be extracted as electric energies
- From the view point of Green-ILC, it is worth to study the possibilities to apply collective deceleration dump system.
- It should be checked that it works for the ILC long beam condition.
- If introducing the bunch compression after the collision point, it is possible to shorten the length of the beam dump facility.
- Efficiency of recovering energy is important from the view point of Green-ILC

Dr. Perret-Gallix was developing the most advanced simulation of plasma beam-dump.
Dr. Perret-Gallix は最も進んだプラズマ･ビームダンプのシミュレーションを行っていました。

My memorial picture / 私の思い出の写真:
This is a picture I took when I discussed about physics with Dr. and Mrs. Perret-Gallix in a restaurant near CERN on 17 Oct. 2015 .
これは、私がDr. Perret-Gallix 夫妻と2015年10月17日にCERN近郊で物理について語り合った際に撮った写真です。