2006年からDenisとともに

岩手県立大学

鈴木厚人

日仏素粒子物理学研究所（FJPPL）とDenis

2006年５月２９日FJPPL調印

CONVENTION DE CREATION D'UN LABORATOIRE INTERNATIONAL ASSOCIÉ (LIA)

"France Japan Particle Physics Laboratory" (FJ-PPL)

POUR LES PARTIES FRANÇAISES

Le ***Centre national de la recherche scientifique,*** ci-après dénommé **CNRS**, établissement public à caractère scientifique et technologique dont le siège est sis 3, rue Michel-Ange, 75794 Paris Cedex 16 (France), représenté par son Directeur Général, Arnold MIGUS,

Agissant au nom et pour le compte de :

l'**Institut National de Physique Nucléaire et de Physique des Particules**, ci-après dénommé **IN2P3**, représenté par son directeur, Michel SPIRO,

Pour le Centre National de la Recherche Scientifique

Arnold MIGUS
Directeur général du CNRS

Pour l'Institut national de physique nucléaire et de physique des particules

Michel SPIRO
Directeur de l'IN2P3

Pour le Commissariat à l'énergie atomique

Yves CARISTAN
Directeur des Sciences de la matière

Pour la High Energy Accelerator Research

Atsuto SUZUKI
Directeur général de la KEK

CNRS
（仏国立科学研究センタ）

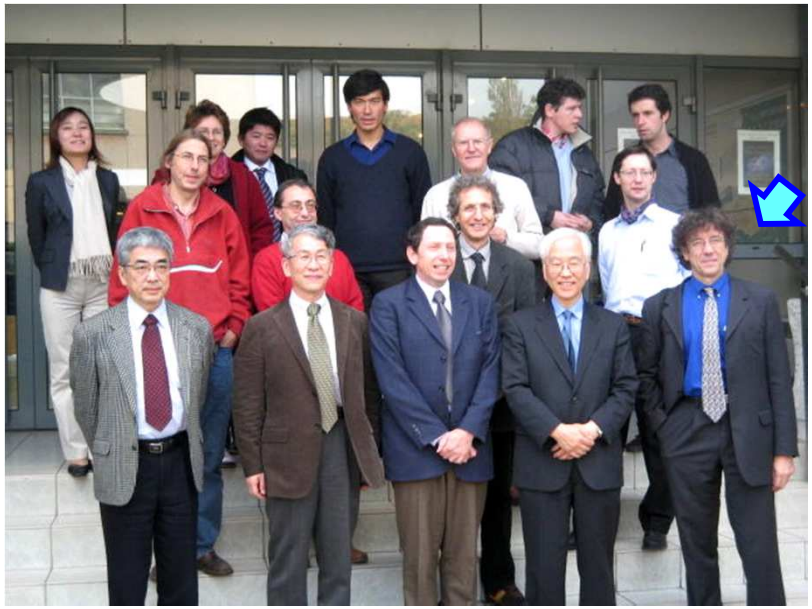
IN2P3
（仏原子核素粒子物理研究所）

CEA
（仏原子力庁）

KEK

FJPPL オフィス（KEK）

KEKと仏研究所間での本格的な共同事業の開始
2006年１１月

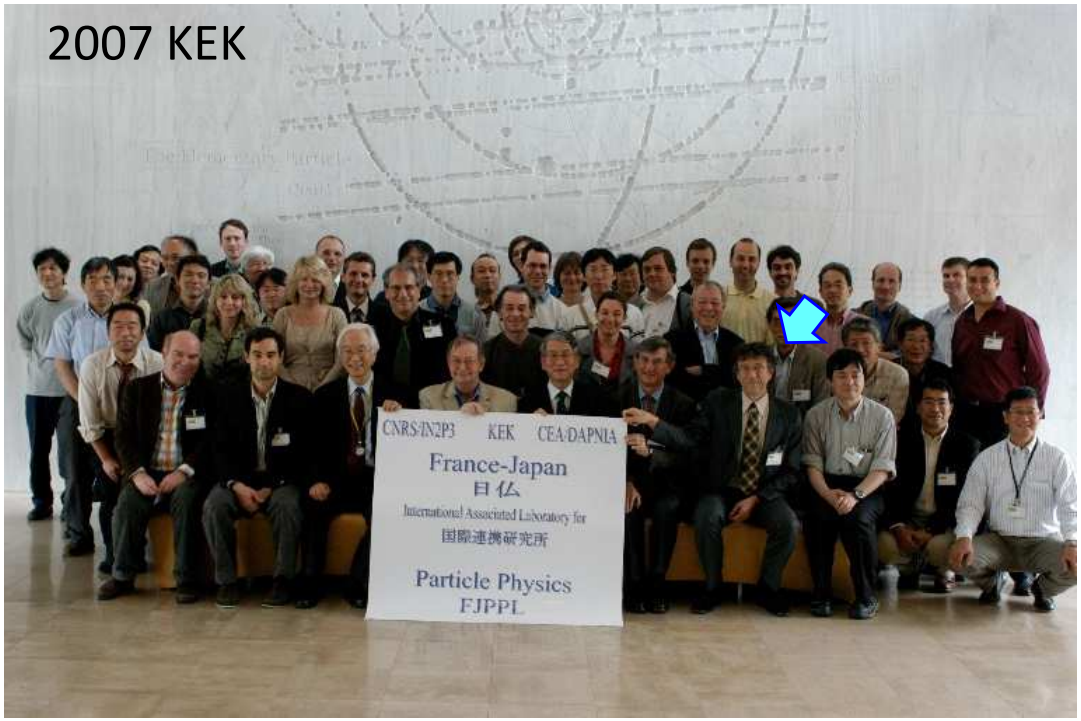


CNRS/IN2P3

CNRS/Orsay（オルセー研究所）

CEA/Saclay（サックレイ研究所）

FJPPLワークショップとDenis



Workshop FJPPL'07

9 mai 2007 à 09:00 → 12 mai 2007 à 18:30 Europe/Paris

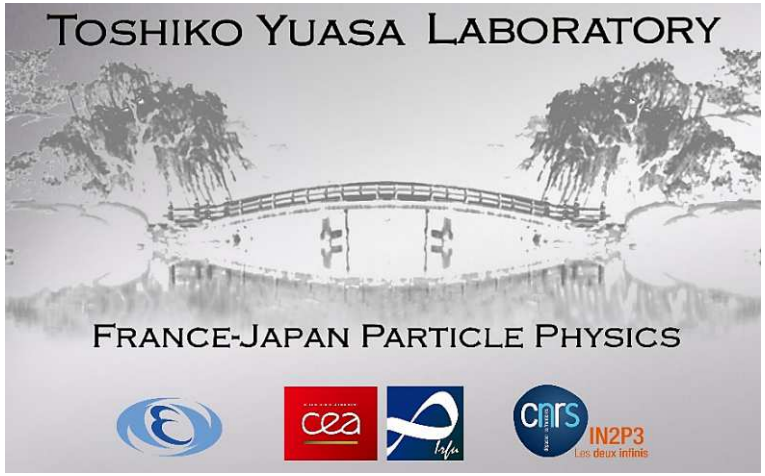
Bldg 4 1st floor Seminar Hall (KEK, Tsukuba Japan)

Denis Perret-Gallix (IN2P3/CNRS) , Fumihiko Takasaki (KEK)

FJPPLワークショップ責任者：
デニス　ペリーガレ、高崎史彦

FJPPL ＝ 湯浅年子研究所 (TYL)が2009年からスタート

日仏素粒子物理学研究所
Toshiko Yuasa Laboratory



From left to right: Fumihiko Takasaki (Japanese TYL Director, KEK), Etienne Augé (IN2P3/CNRS dep. Director), Atsuto Suzuki (KEK Director General), Nicolas Alamanos (CEA/Irfu Dep. Director), Sawako Hanyu （Ochanomizu Univ. President), Yuzo ASANO （Yuasa's Family), Toshio ICHII （Yuasa's Family), Denis Perret-Gallix (French TYL Director, CNRS/IN2P3)

お茶の水大（湯浅年子氏の母校）で

Toshiko Yuasa Laboratory Ceremony

May 21,2009
Tsukuba International Congress Center 4F
Conference Room 406

－PROGRAMME－

16:55	Toshiko Yuasa:Memories	Yuzo Asano
17:15	Ochanomizu University and Dr. Yuasa	Sawako Hanyu
17:45	Woman in Physics	Masako Bando
18:30	～Banquet～ @ Conference Room 201	

cnrs cea お茶の水女子大学 Ochanomizu University

PARTICLE PHYSICS JOINT LAB JAPAN - FRANCE

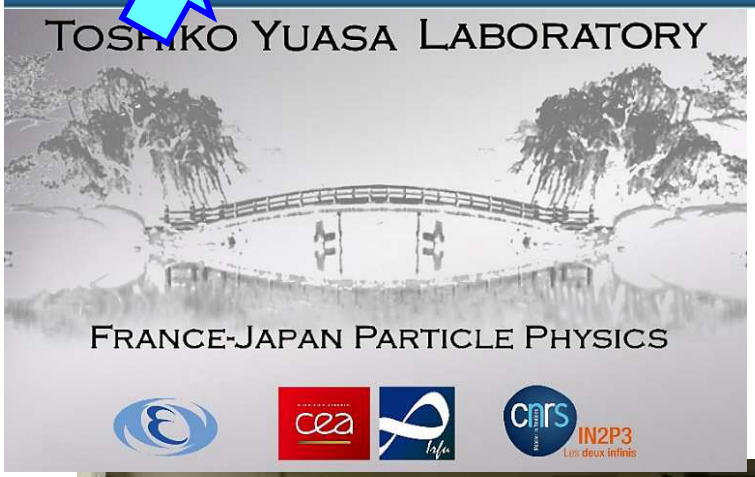
Entry:
http://www.kek.jp/event/FJPPL.html
Joint Workshop:2009 FJPPL WORKSHOP
http://indico.in2p3.fr/conferenceDisplay.py?confId=1704

Workshop TYL'10

15 juin 2010 à 08:30 → 17 juin 2010 à 23:30 Europe/Paris

Petit Amphi (LAPP, Annecy-Le-Vieux (France))

Denis Perret-Gallix (IN2P3/CNRS), Fumihiko Takasaki (KEK)



Accelerators and Particle Physics in Japan

ATSUTO SUZUKI

Workshop FJPPL'10, LAPP, Annecy-Le-Vieux
15-17 June 2010

“高エネルギー加速器科学”における日欧連携

第一回日欧合同科学・技術委員会会議
2011年6月16日

フランス

ドイツ

ビアーパーティ　：2009年

グリーン ILC と Denis

“Sustainable加速器・コライダー”に関するICFA検討パネルの提案 2012？

The recommendation for this ICFA Panel had been earlier submitted by Atsuto Suzuki (Attachment VII); Mitsuaki Nozaki discussed this further (Attachment VIII). The goal is to improve the power efficiency of every accelerator component; to have energy recovery from the accelerator; to re-use the recovered energy; and to have a stand-alone system to provide all or part of the accelerator power needs.

Dear Atsuto, David and Lenny,

At Friday's ICFA meeting, there was a discussion on Atsuto's proposal for an ICFA Panel on sustainable accelerator/colliders. ICFA requested that the three of you, representing your respective regions, look at the initiatives which already exist in this area, and provide a possible Panel mandate and achievable goal if you believe that there is something that ICFA can usefully add.

Best regards, Steinar

2nd Workshop
Energy for Sustainable Science
at Research Infrastructures

第２回：研究施設におけるエネルギーの循環型・持続可能型科学ワークショップ

23-25 October 2013
CERN
Europe/Zurich timezone

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

ILC: an amazing energy transformer

FROM eV TO TeV:

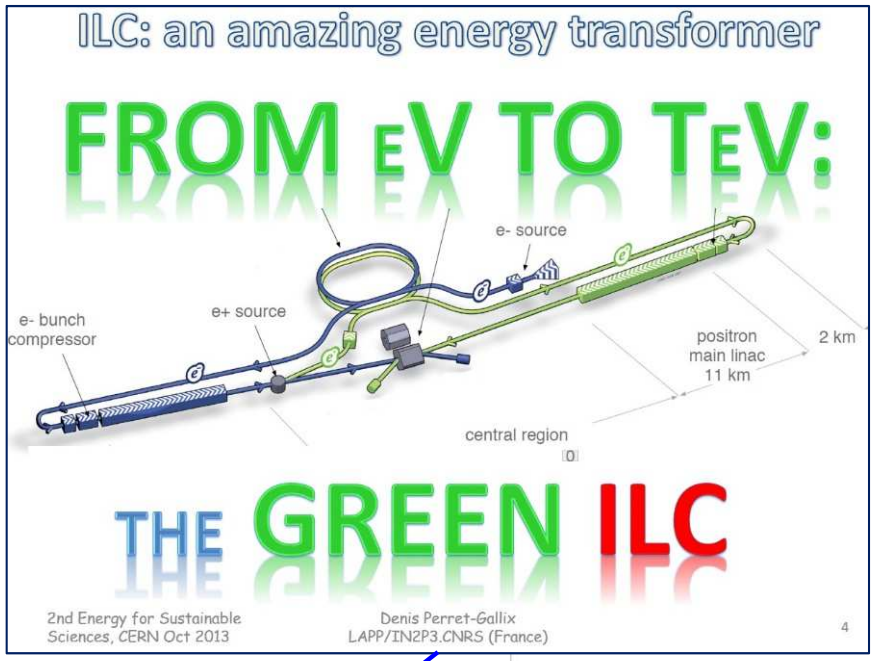
THE GREEN ILC

Denis Perret-Gallix
LAPP/IN2P3.CNRS (France)

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

Atsuto Suzuki (KEK)

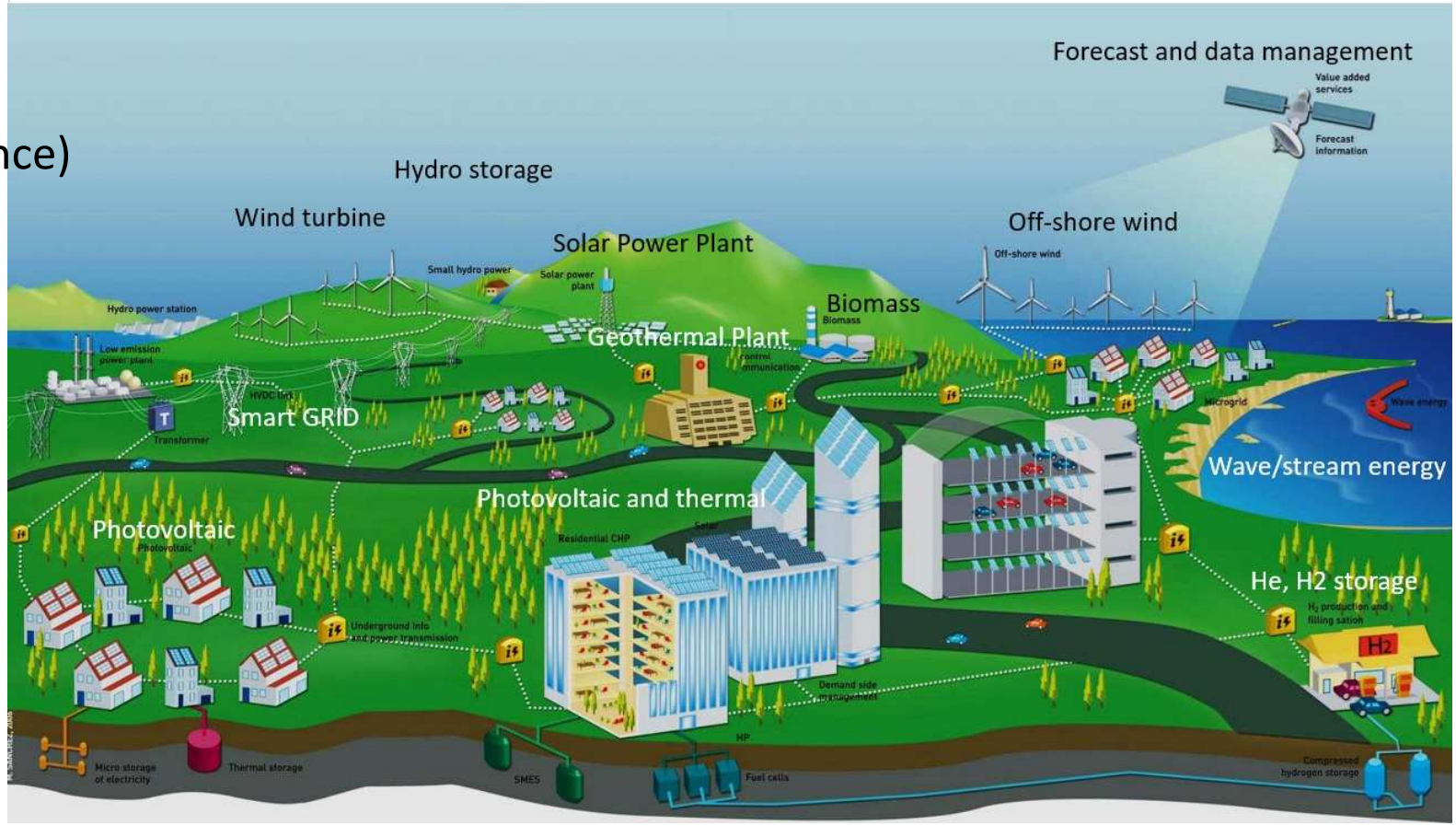
INTER-UNIVERSITY RESEARCH INSTITUTE CORPORATION
HIGH ENERGY ACCELERATOR RESEARCH ORGANIZATION



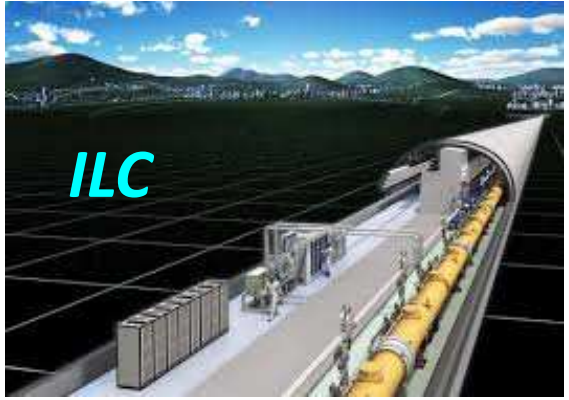
ILCエネルギーセンター構想

ILCエネルギーセンターの将来像

Denis Perret-Gallix
LAPP/IN2P3.CNRS (France)



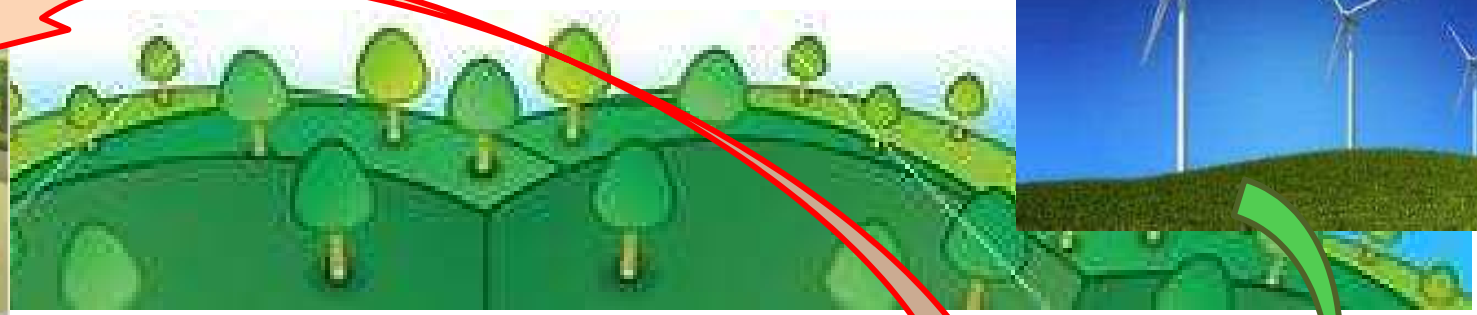
GRID4EU
INNOVATION FOR ENERGY NETWORKS



4. Summary

ILCを自然エネルギーで動かす

エネルギー再利用

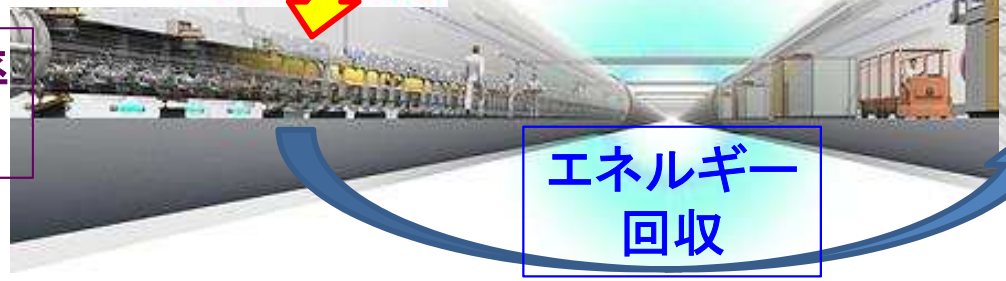


Ross Rate

Infrastructure : 50 MW	50 % : 25 MW
RF System : 70 MW	40 % : 28 MW
Cryogenics : 70 MW	100 % : 70 MW
Beam Dump : 10 MW	100 % : 10 MW
	~ 130 MW

Increase ... covery

エネルギー再利用

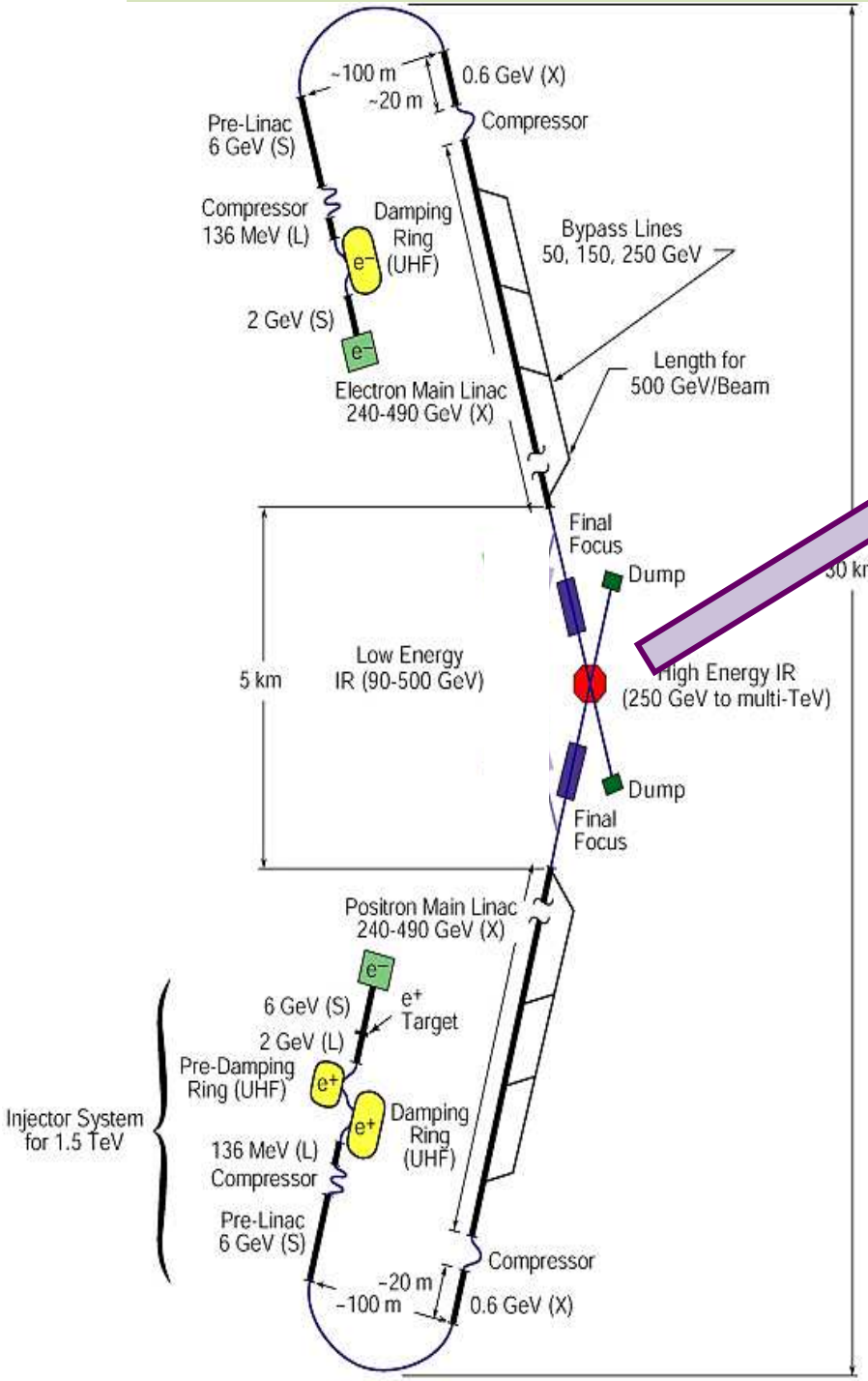


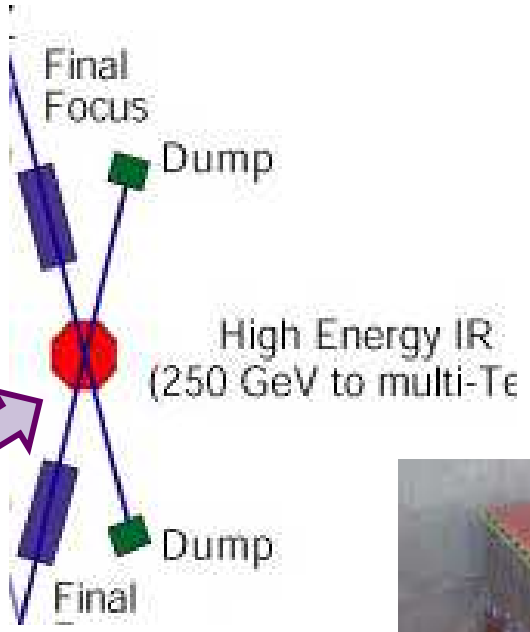
エネルギー効率の改善

エネルギー回収

エネルギー蓄積

衝突後のビームエネルギーの回収 (~10 MW)





- ビームエネルギー回収
- 放射化物の削減

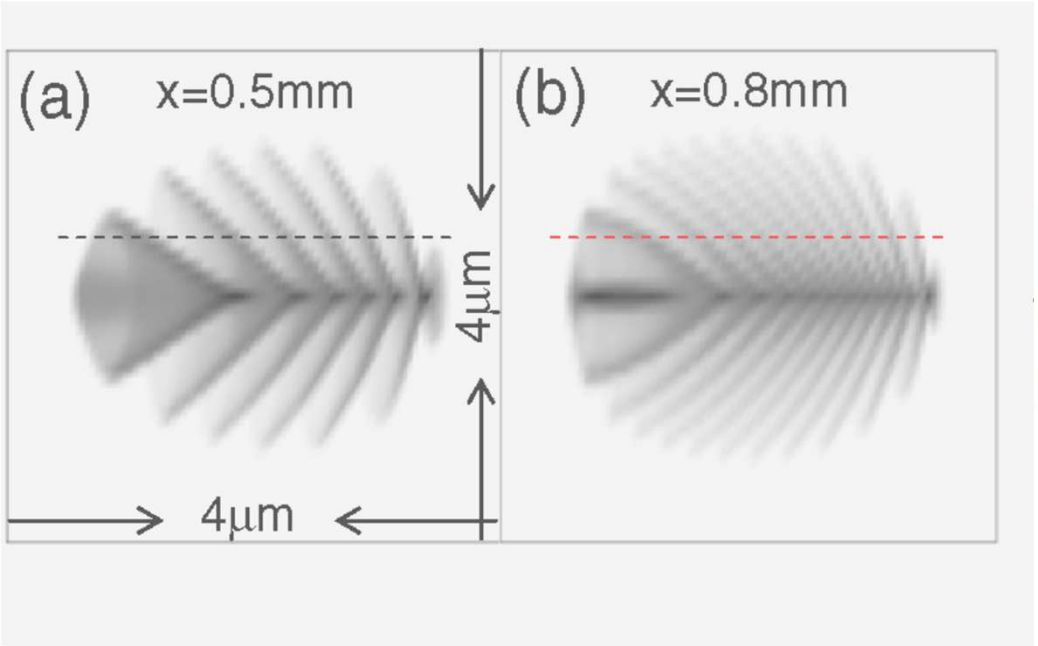
プラズマ状ガスによるビーム減速

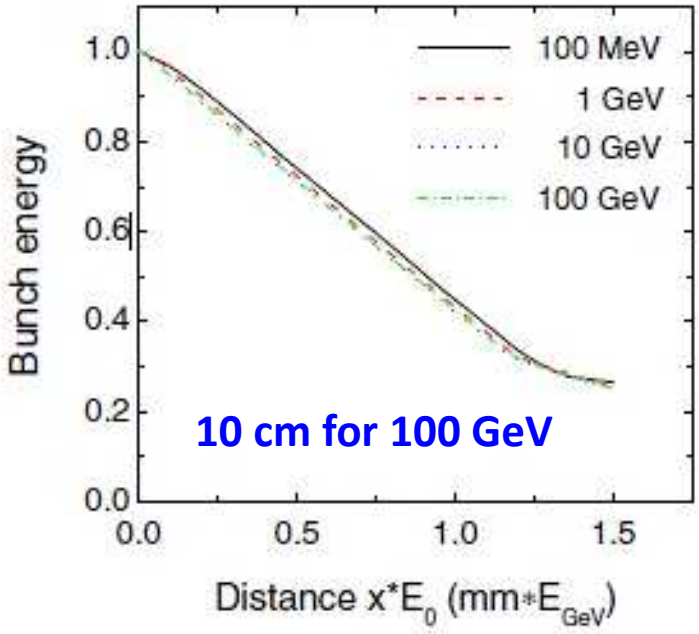
PHYSICAL REVIEW SPECIAL TOPICS - ACCELERATORS AND BEAMS 13, 101303 (2010)

Collective deceleration: Toward a compact beam dump

H.-C. Wu,[1] T. Tajima,[1,2] D. Habs,[1,2] A. W. Chao,[3] and J. Meyer-ter-Vehn[1]
[1]*Max-Planck-Institut für Quantenoptik, D-85748 Garching, Germany*
[2]*Fakultät für Physik, Ludwig-Maximilians-Universität München, D-85748 Garching, Germany*
[3]*SLAC National Accelerator Center, Stanford University, Stanford, California 94309, USA*
(Received 10 December 2009; published 5 October 2010)

プラズマの集団運動利用する減速





- アンダーデンス・プラズマの減速長（阻止能）は凝縮物質より3桁小さい ıde smaller than the stopping in condensed matter.
- The muon fluence is highly peaked in the forward direction.

ILCにおけるビーム阻止能（長さ）

$$L_{dump}\,[\mathrm{m}] \approx 1.7 \times 10^{13} \frac{\sigma_T^2\,[\mathrm{cm}]}{N_b} E_0\,[\mathrm{GeV}]$$

$$here \quad \sigma_T \geq 0.6\sigma_L \;\&\; \quad \sigma_T \geq 1.9 \times 10^{-6}\sqrt{N_b \sigma_L}$$

(electron bunch)

ILC $\quad N_b = 2 \times 10^{10} \quad E_0 = 500\mathrm{GeV}$

$$L_{dump}\,[\mathrm{m}] \approx 4.3 \times 10^5 \sigma_T^2\,[\mathrm{cm}]$$

$\sigma_T \approx 50\ \mu m$, $\sigma_L \approx 3\ \sigma_T \approx 150\ \mu m$

→ L = 10 m for Li gas

今後の検討
- 集団プラズマ減速の原理検証実験
- 発生した航行場エネルギーの回収方法

Green-ILC　AAA-2014 報告書

先端加速器科学技術推進協議会

2014 AAA Green ILC Working Group

2015.05.27

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4 Energy Saving Technology of Accelerator Device

Collector Power Depression (CPD) Klystron (Yoshio Kawakami, Toshiba-Electrontube) 23

Operation test of CPD klystron (Ken Watanabe, KEK) 25

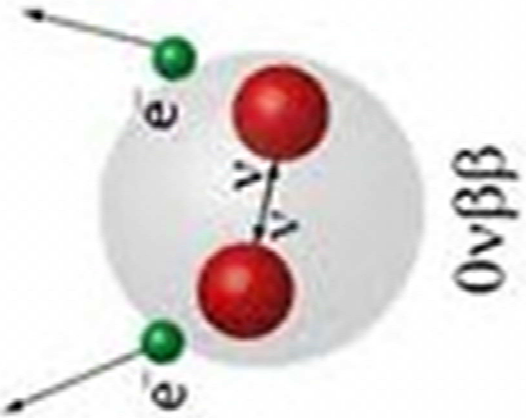
Denisと物理も

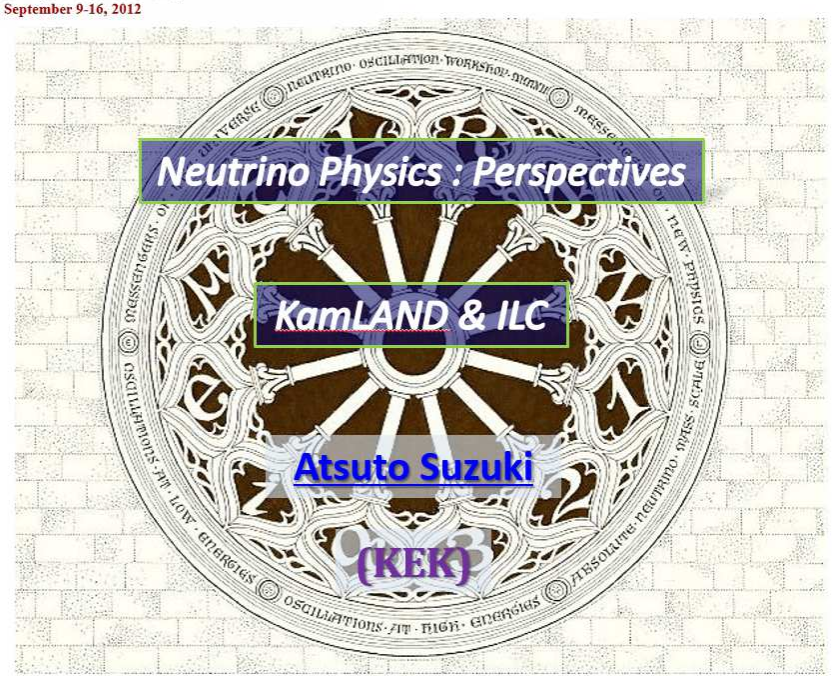
他の共同研究者: 藤本、栗原、杉本、石川、KEK

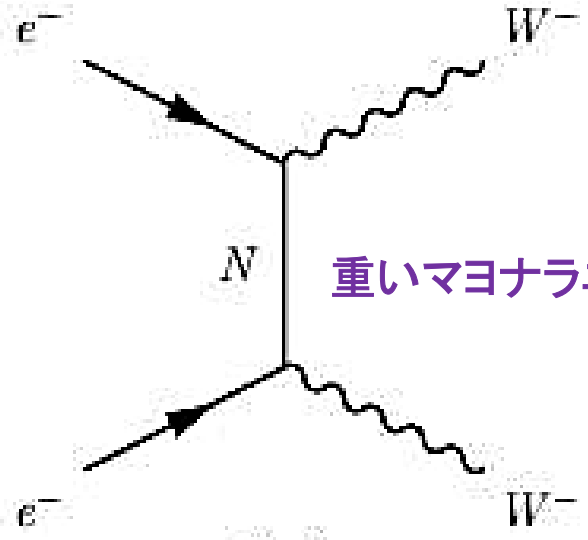
NOW 2012

Neutrino Oscillation Workshop
Conca Specchiulla (Otranto, Lecce, Italy)
September 9-16, 2012

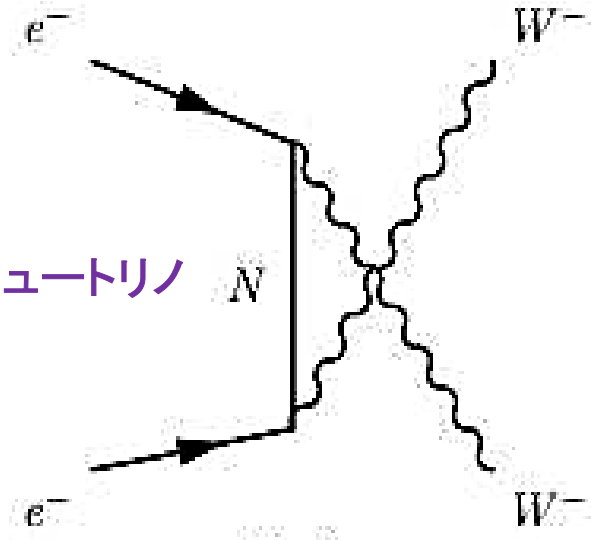
ILCにおける
逆ニュートリノナシ二重ベータ崩壊の探索

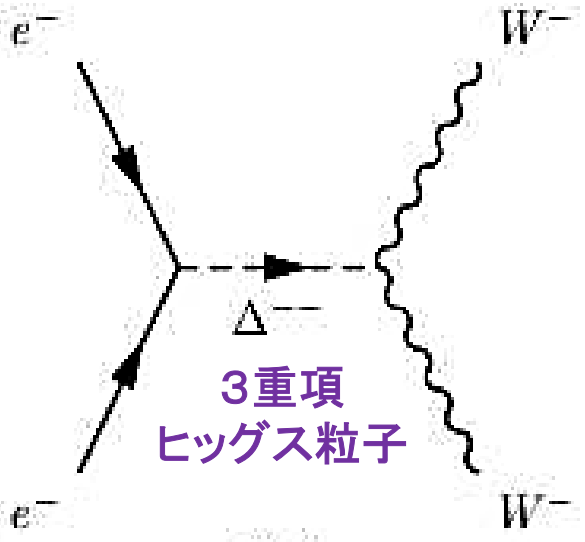






重いマヨナラニュートリノ

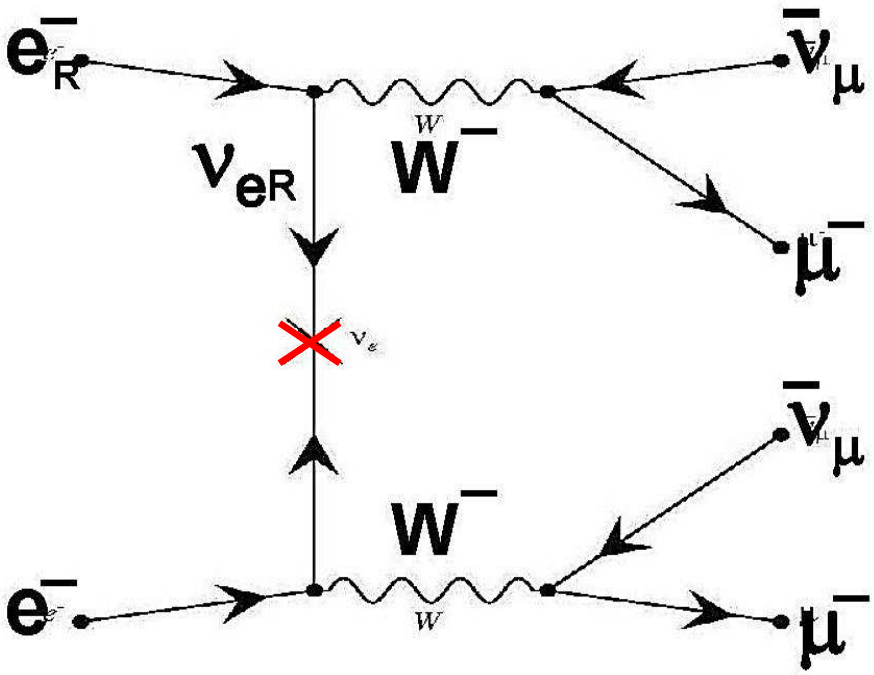




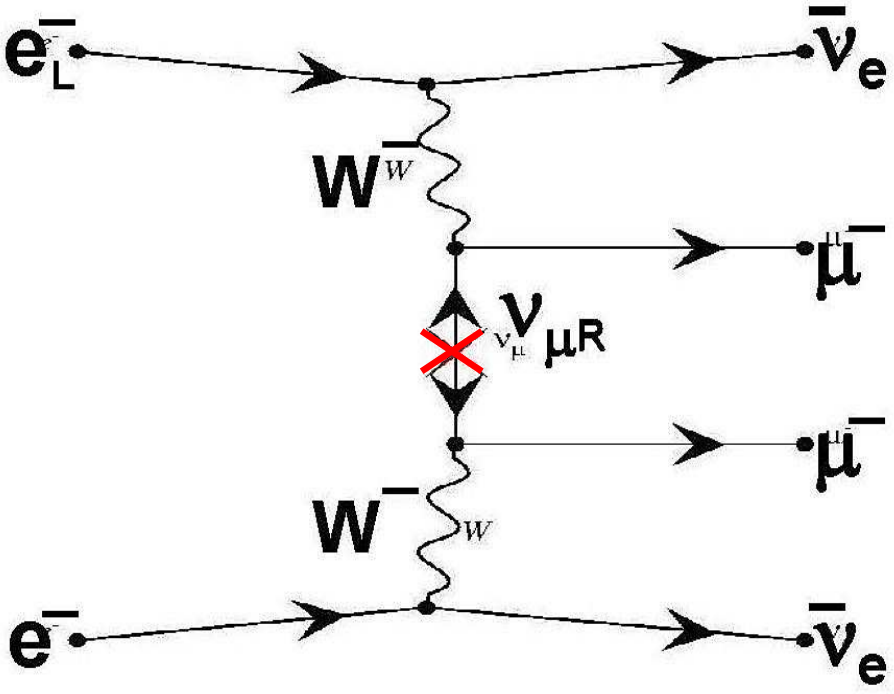
3重項
ヒッグス粒子

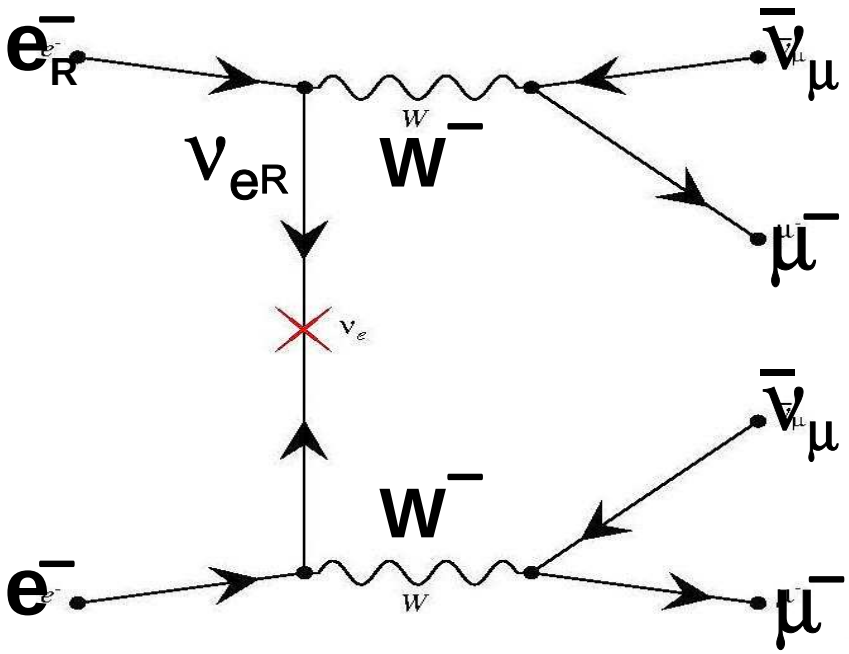
電子偏極の利用による2種類の反応の分離

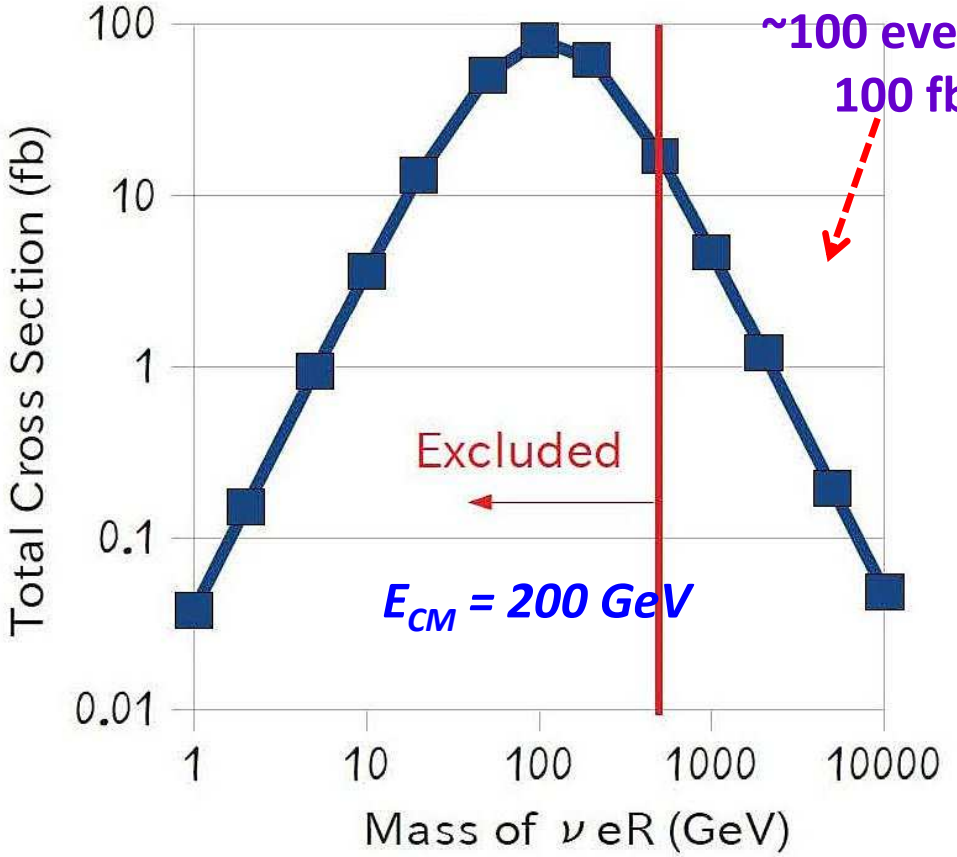
右巻き偏極ビーム



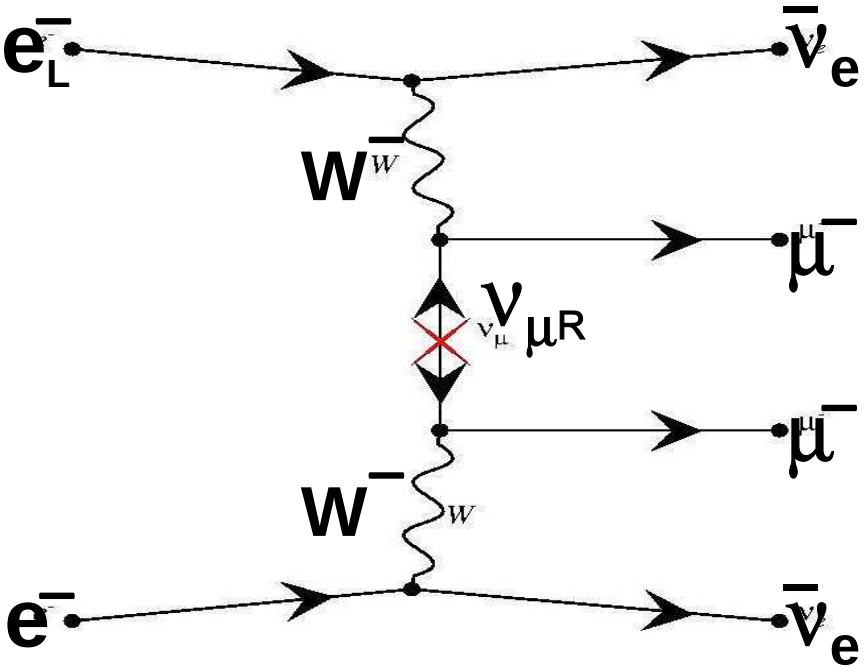
左巻き偏極ビーム

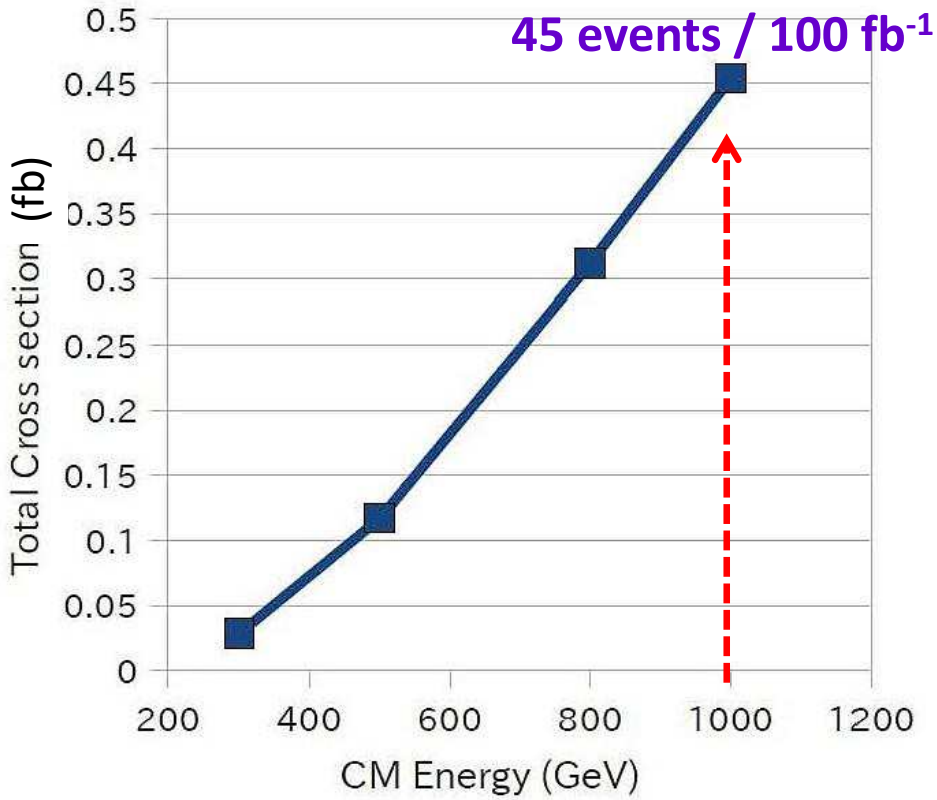






- A W^- pair-production occurs through a right-hand electron-neutrino.
- A CM-energy is 200 GeV.
- Cut:$30^\circ < \theta_\mu < 150^\circ$, $E_\mu > 10$ GeV
- We assume a signal is background-free.
- Total cross sections in fb are shown in Figure .
- We can expect about 100 events for 1 TeV ν_{eR}-mass after accumulating 100 fb^{-1}.





- A W^- pair-production occurs through a right-hand muon-neutrino
- A mass of a right-hand muon-neutrino is set to be the same as a W-boson mass.
- Cut:$30^o < \theta_\mu < 150^o$, $E_\mu > 10$ GeV
- We assume a signal is background-free.
- Total cross sections in fb as a function of a CM-energy are shown in Figure
- We can expect about 45 events at a CM-energy of 1 TeV after accumulating 100 fb^{-1}.

We really lost a strong pillar,
bridging between
France and Japan.

We pay our last respects
to Denis.