

# Roadmap for Particle Physics in Japan

Atsuto Suzuki (KEK)

*Joint ACFA GDE, Sendai  
March 3, 2008*

# KEK Current Activities



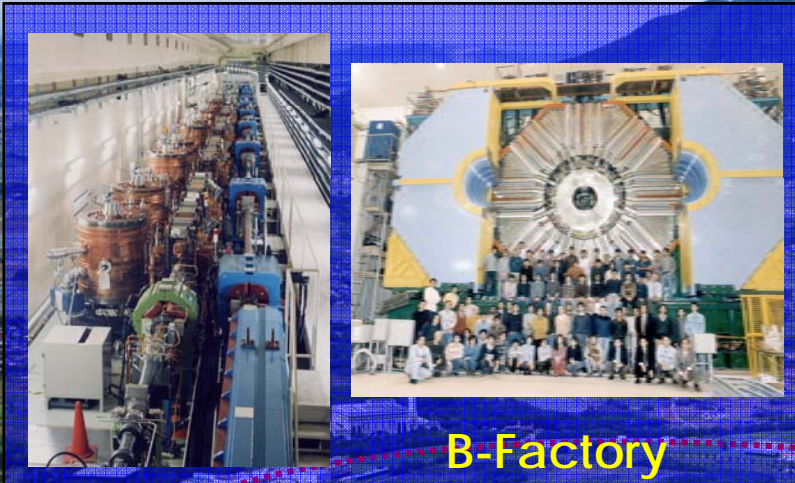
J-PARC in Tokai



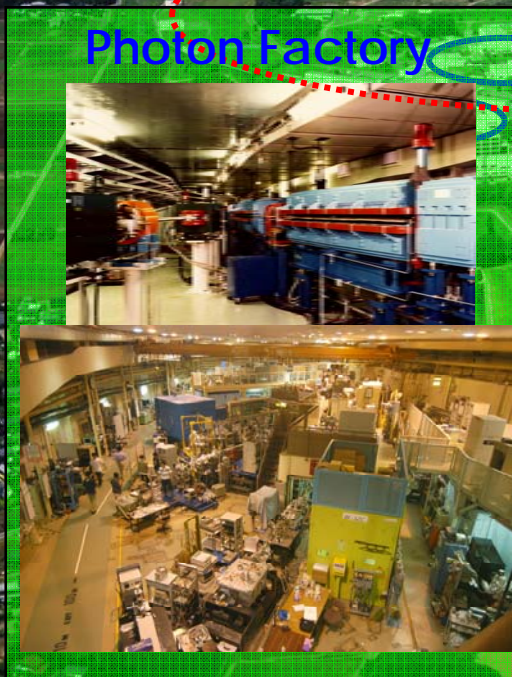
Linear succeeded in 181 MeV acceleration in Jan. 2007



3 GeV RCS beam commissioning succeeded in Nov. 2007



B-Factor



Photon Factory



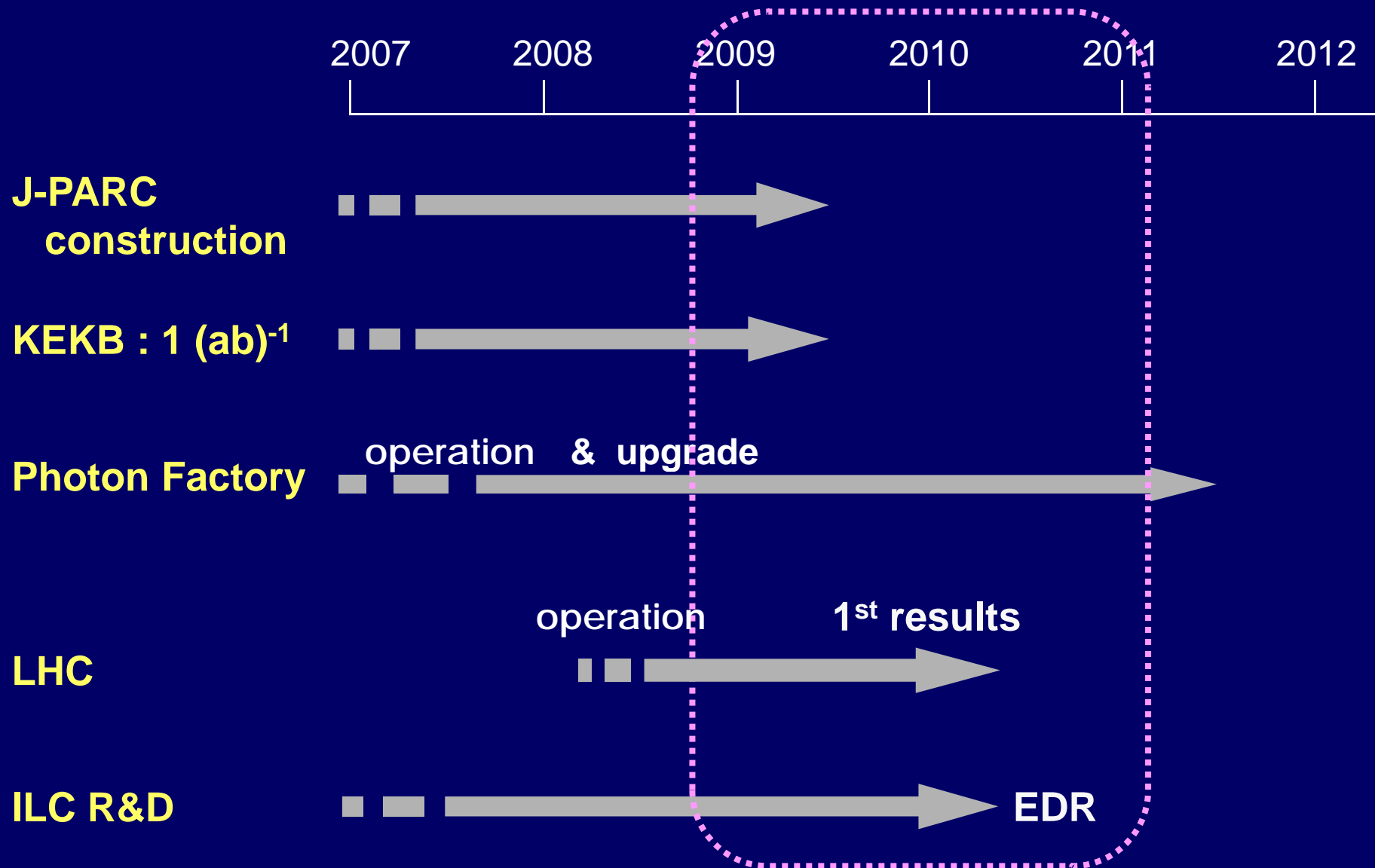
ILC Test Facility



LHC at CERN



# Timeline of Current Projects

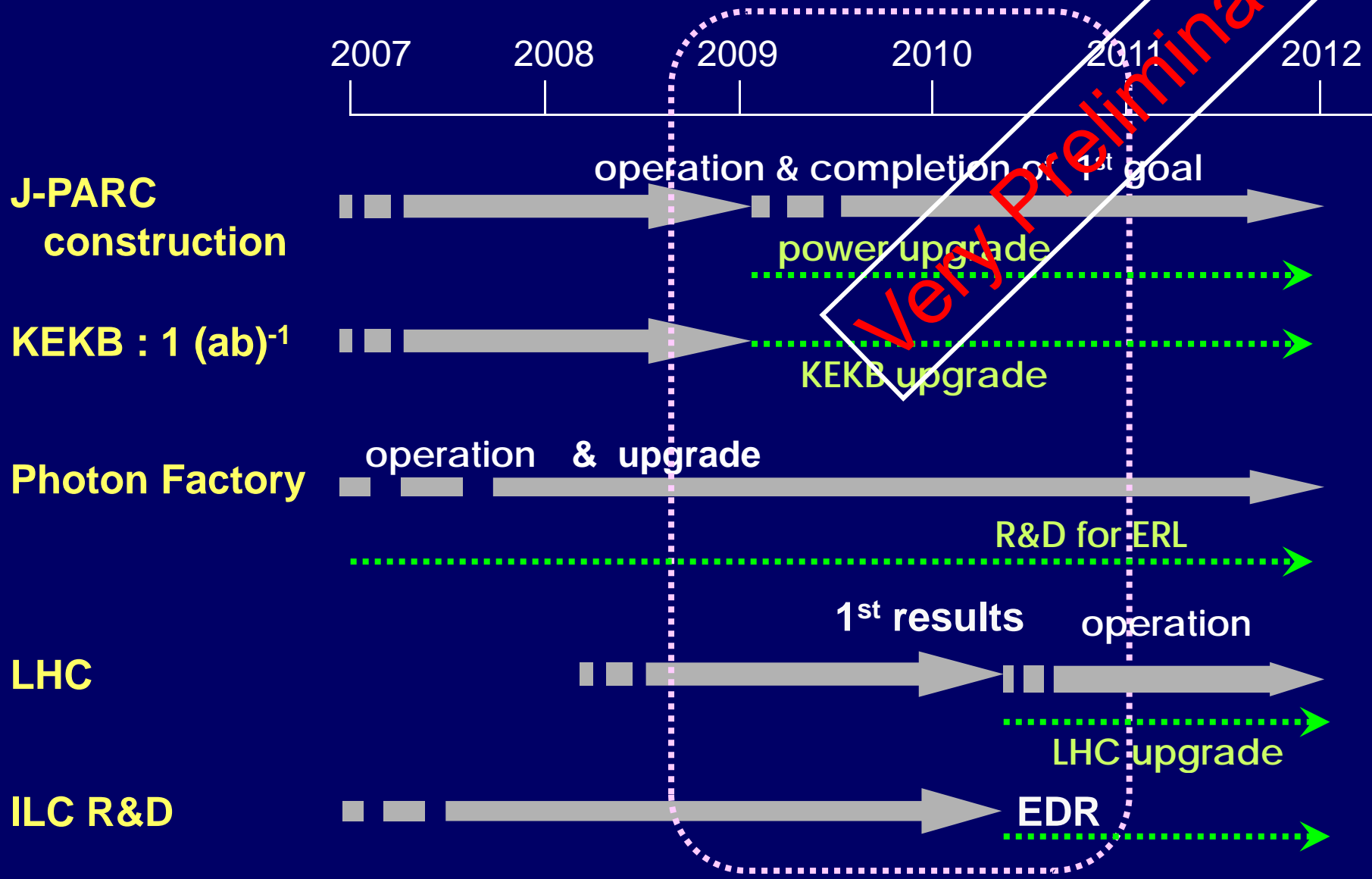


# JAHEP: Roadmap Report on Prospects for Particle Physics (October, 2006)

---

- **Community's master plan**
  - Highest priority is given to ILC.
  - Before the ILC experiment commences, flavor physics at KEKB and J-PARC, and energy frontier physics at LHC are promoted.
  - The above two goals should be pursued in a single master plan.
- **Action plans before the ILC approval**
  - ILC R&D
  - Completion/commissioning of J-PARC
    - **Considering the world competition, it is urgent to improve neutrino intensity**
  - Continuation of KEKB/Belle with upgrading

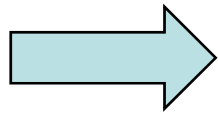
# KEK Roadmap (July, 2007 : KEK Roadmap Panel led by F. Takasaki)



# Plan for Improving Neutrino Beam Intensity by Main-Ring Upgrade

Linac : 181 MeV to 400 MeV

0.60MW  
0.28 Hz



0.91 MW  
0.57 Hz



1.66MW  
0.52 Hz



RF system improvement

- Shorten acceleration time
- More RF system
- Magnet power system

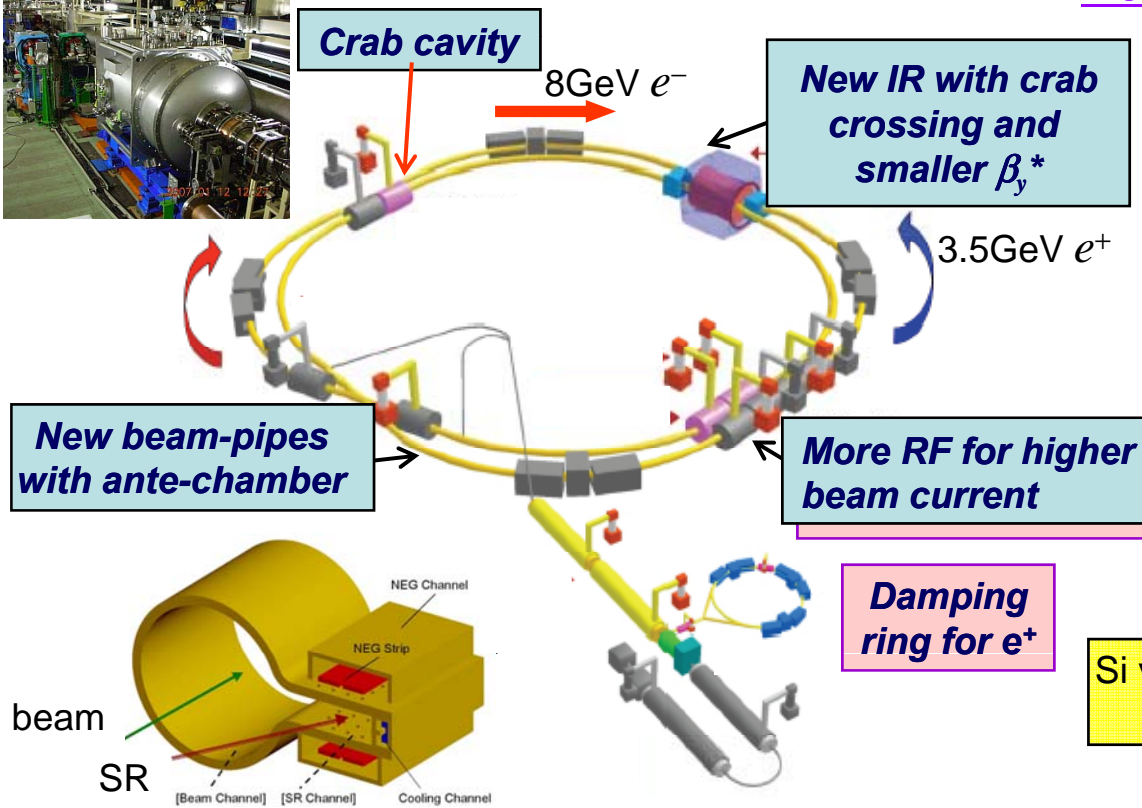
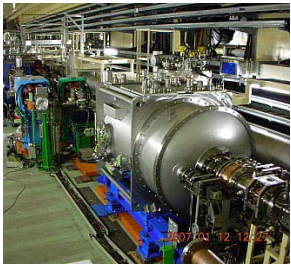


BM power supply

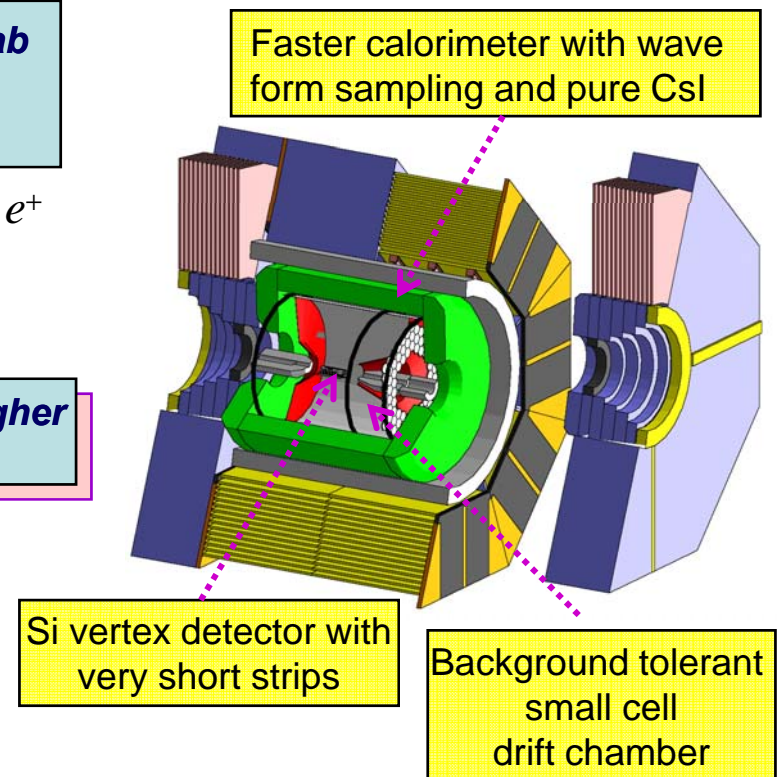
- More beam per pulse
- Operation of 3 GeV RCS in harmonic number =1

# KEKB Upgrade Plan : Super-B Factory at KEK

- Asymmetric energy  $e^+e^-$  collider at  $E_{CM}=m(\Upsilon(4S))$  to be realized by upgrading the existing KEKB collider.
- Initial target:  **$10\times$  higher luminosity**  $\cong 2\times 10^{35}/\text{cm}^2/\text{sec}$  **after 3 year shutdown**  
 $\rightarrow 2\times 10^9 \overline{B}B$  and  $\tau^+\tau^-$  per yr.
- Final goal:  **$L=8\times 10^{35}/\text{cm}^2/\text{sec}$**  and  $\int L dt = 50 \text{ ab}^{-1}$



## Belle with improved rate immunity



# Super-B Factory : Motivation

**Motivations :**  
**not driven by the LHC results**



- **If the LHC finds New Physics at the TeV scale,**  
**Its flavor structure must be examined experimentally.**  
**A Super-B Factory is the best tool for this purpose.**
- **If the LHC finds nothing except for SM-like Higgs,**  
**Studying/searching for deviations from the SM in flavor**  
**physics is one of the best ways to find new physics.**



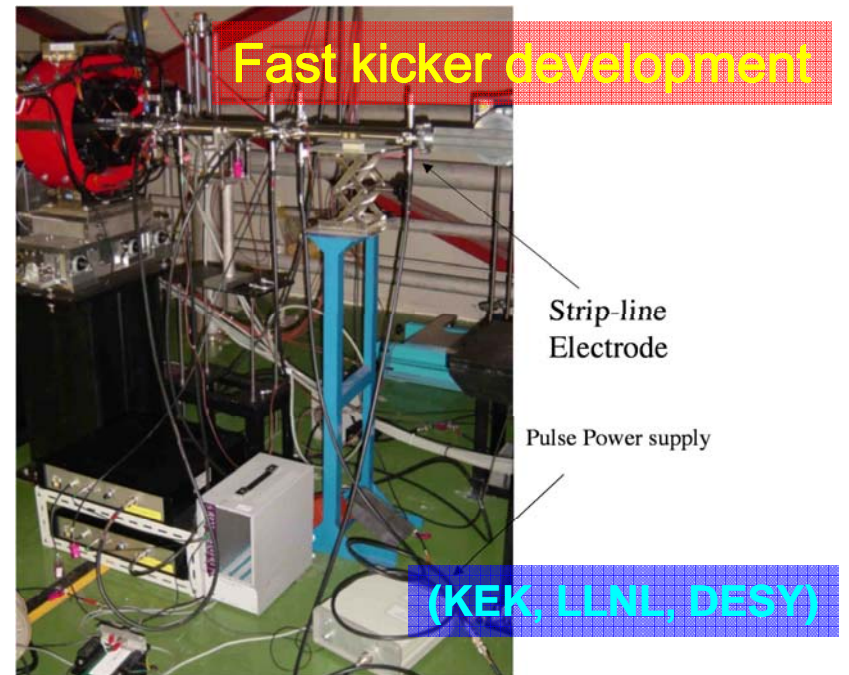
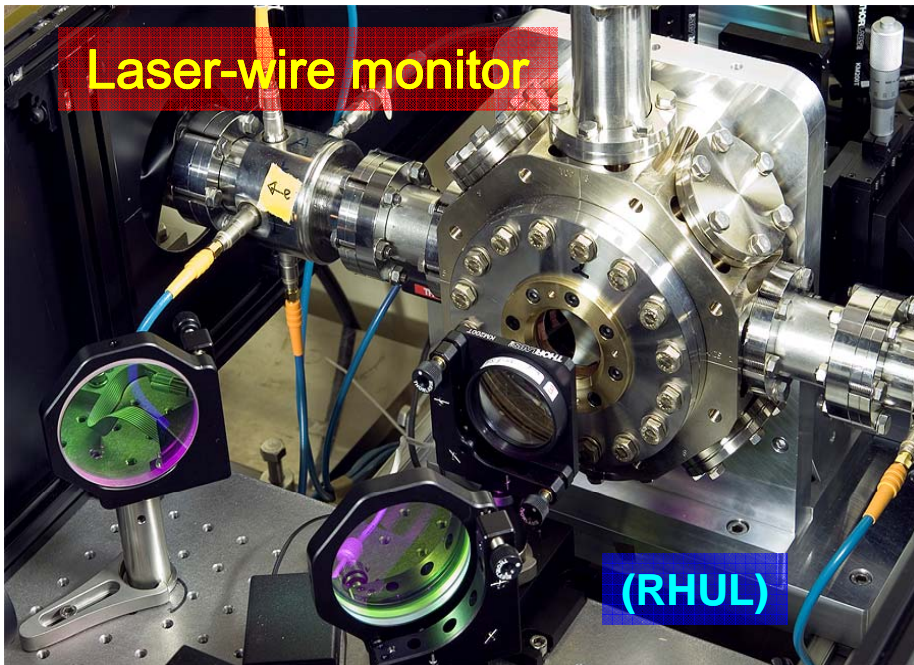
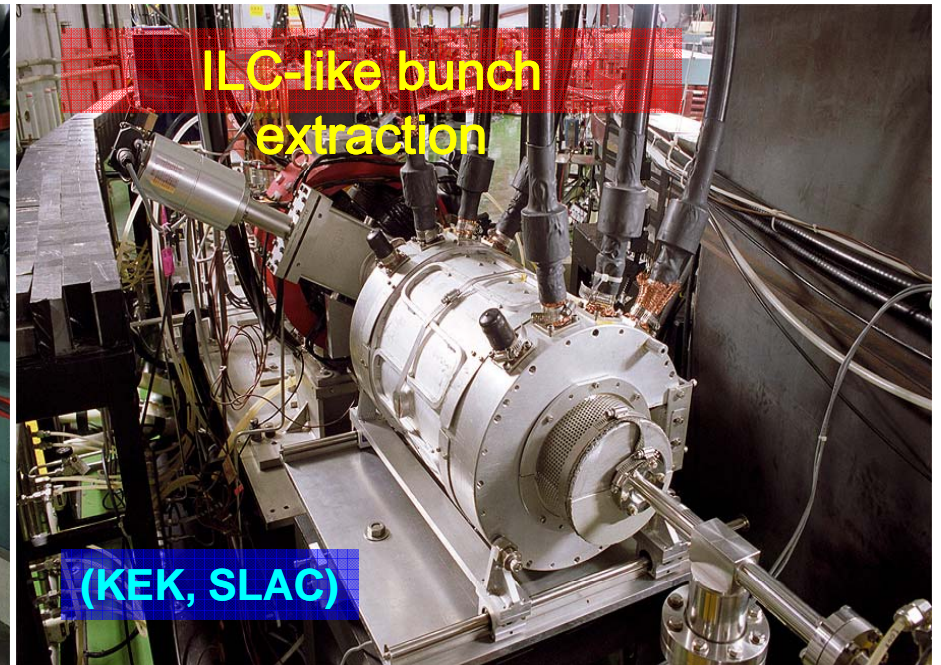
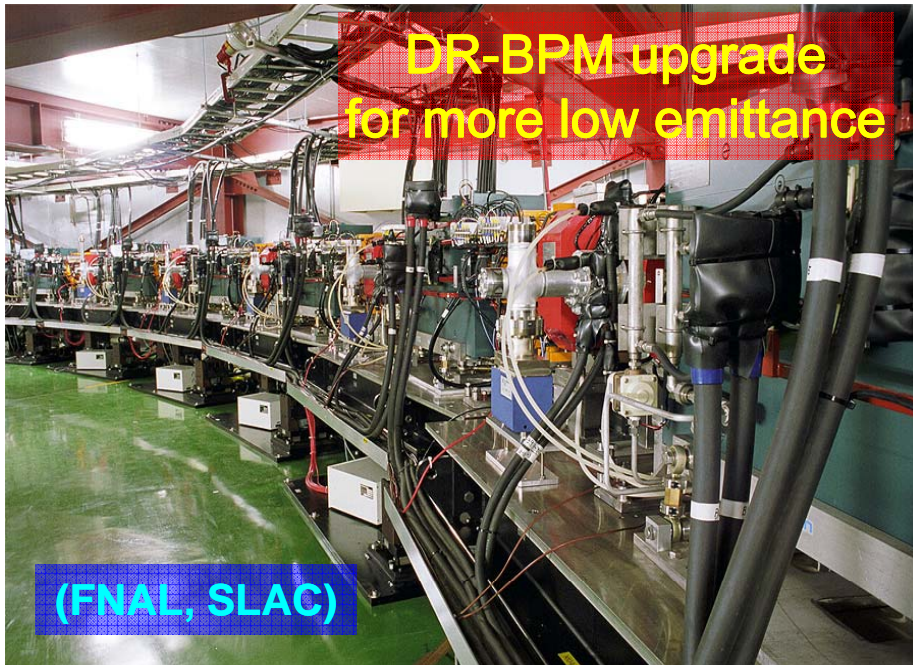


# ILC R&D

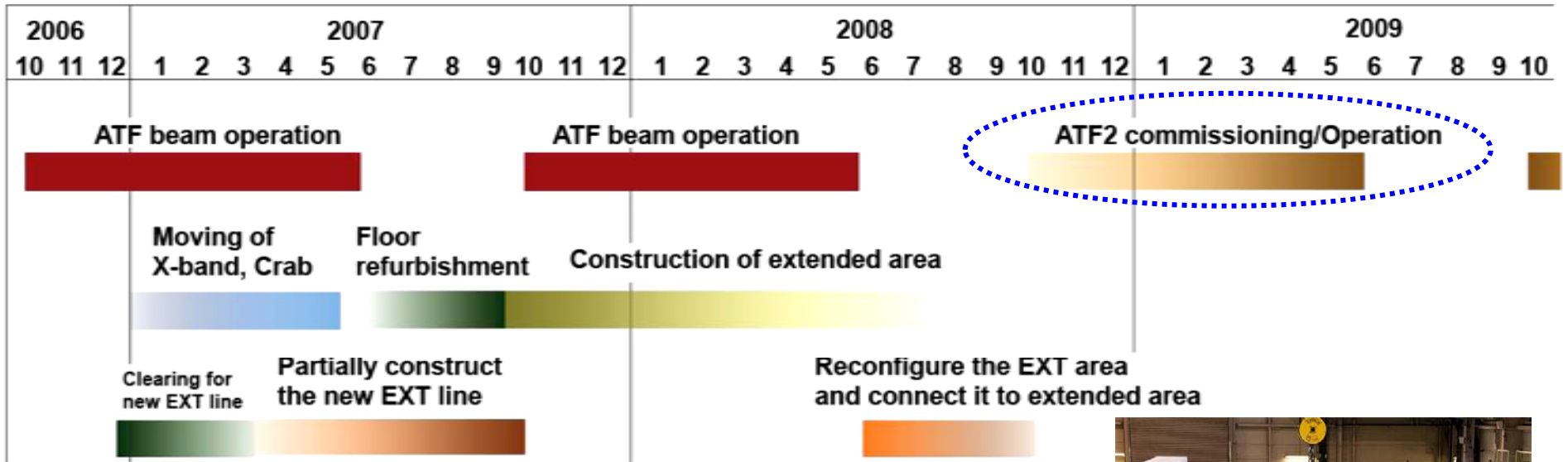
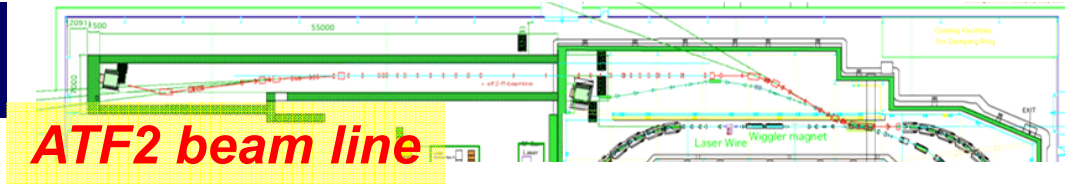
## R&D Items

- Precise beam handling in ATF
- Superconducting RF in STF



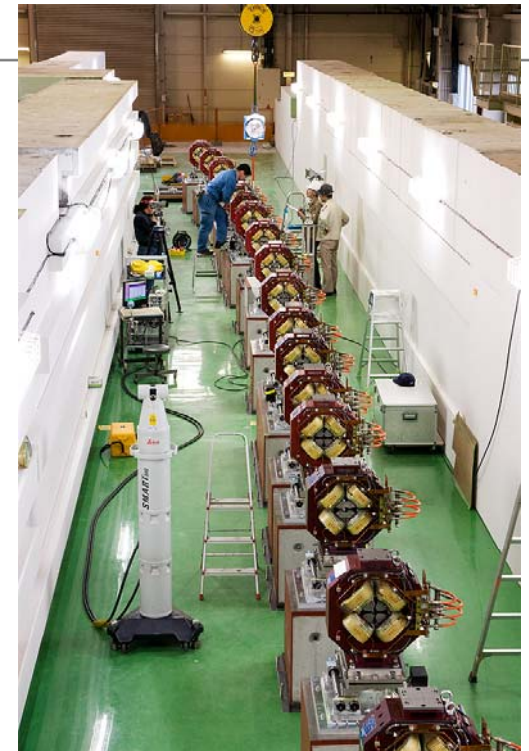


# ATF2 Construction Schedule



## ATF2 beam line: under construction

(IHEP, KEK, SLAC)





## STF ( 2005 – 2009 )



### Phase 1 (2005 -2008)

for quick startup of ILC SCRF, **infra-structure** development subdivided to  
Phase 0.5 : 1 cavity in each short cryostat (cool down:Oct.2007&Feb.2008)  
Phase 1.0 : 4 cavities in each short cryostat (2008)  
Phase 1.5 : replacement of cavities by improved gradient one (2008-2009)

### Phase 2 (2008 - 2010)

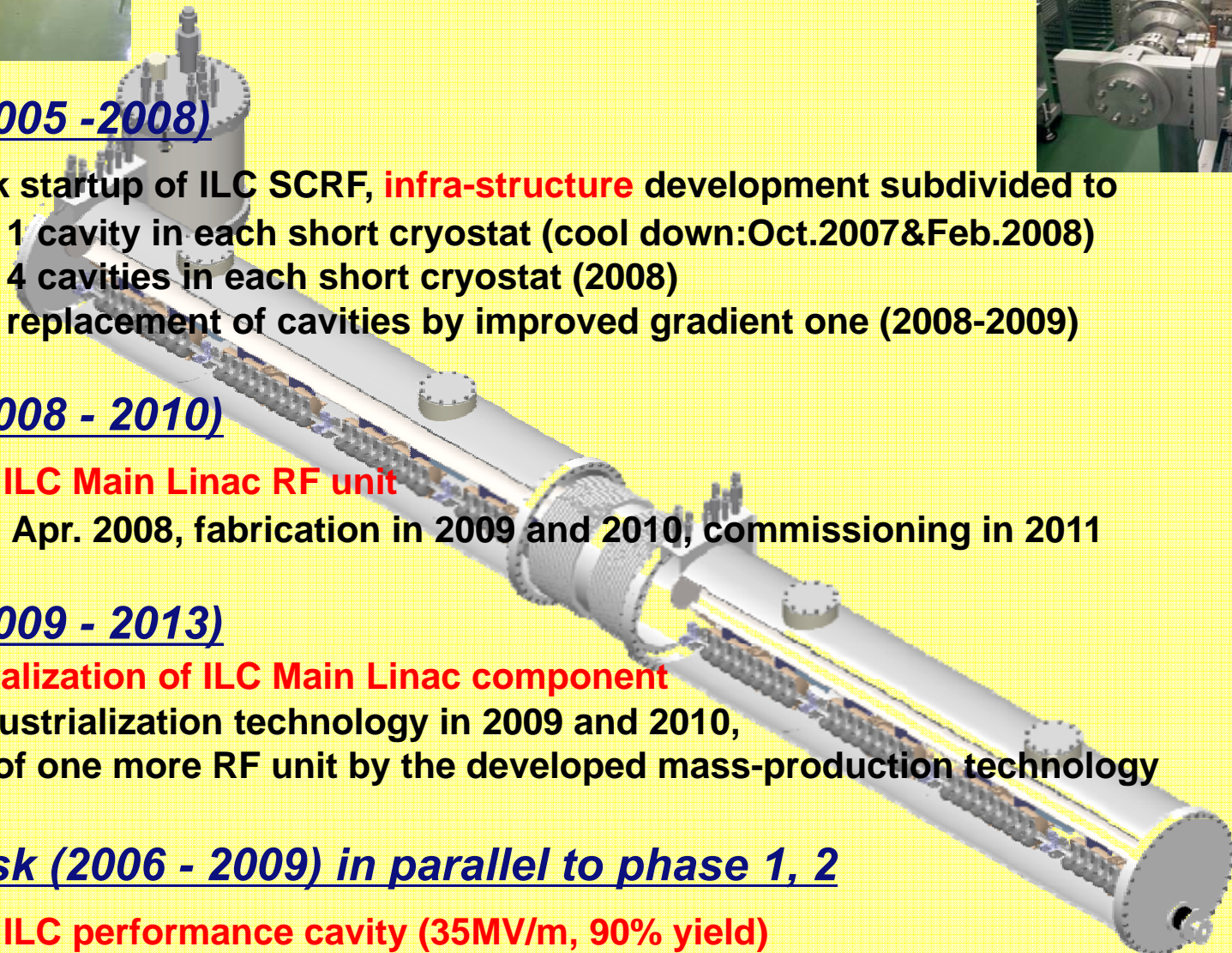
develop **ILC Main Linac RF unit**  
start design Apr. 2008, fabrication in 2009 and 2010, commissioning in 2011

### Phase 3 (2009 - 2013)

**Industrialization of ILC Main Linac component**  
develop industrialization technology in 2009 and 2010,  
fabrication of one more RF unit by the developed mass-production technology

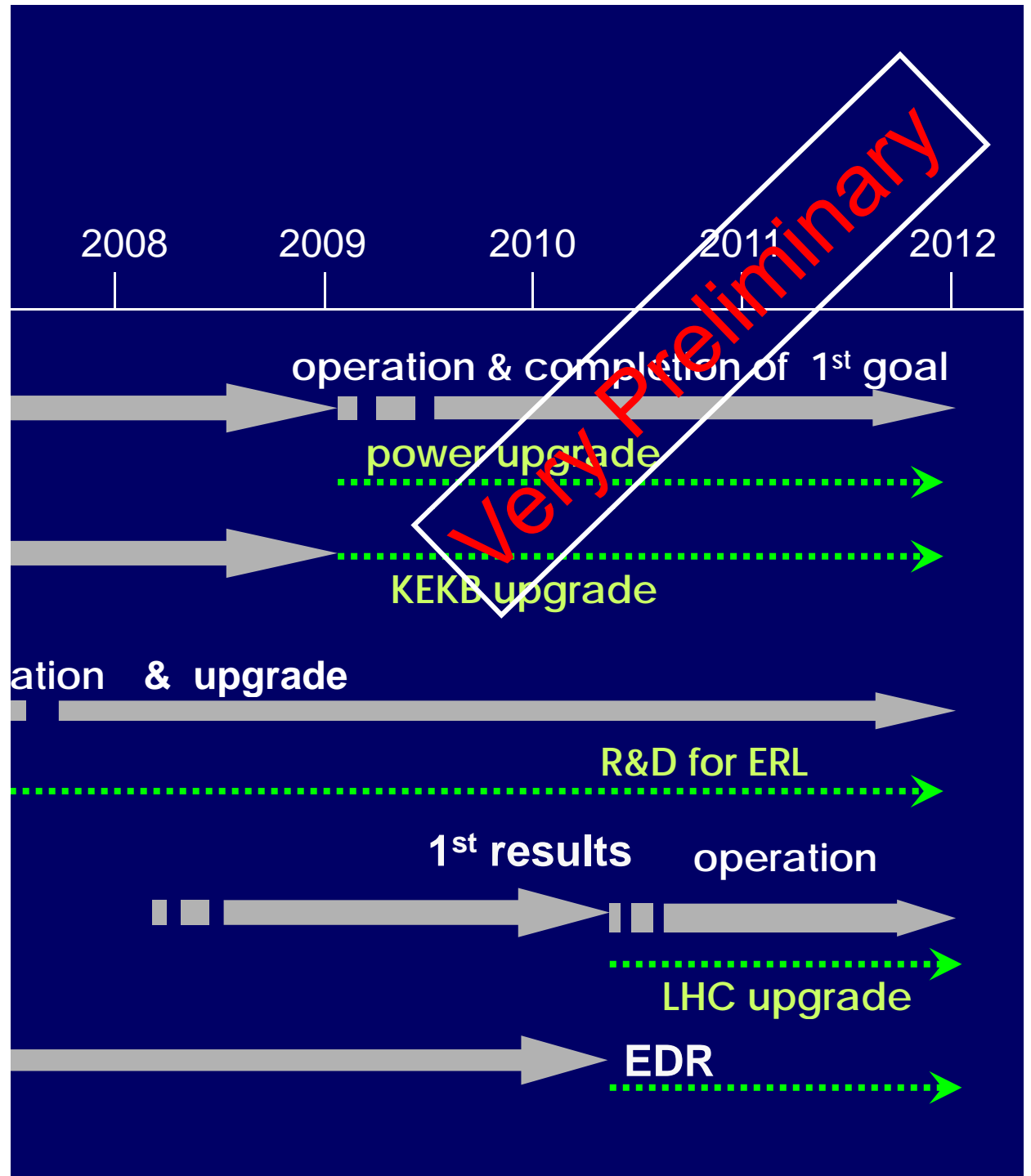
### GDE S0 task (2006 - 2009) in parallel to phase 1, 2

develop **ILC performance cavity (35MV/m, 90% yield)**





a total cost  
for 2009 ~ 2013



To realize  
the business or first class projects,  
it is indispensable to  
procure social supports.

## Federation of Diet Members for promotion of the ILC project

- **Built in 2006 (June 15<sup>th</sup>):**
- **Members:** At present more than 60 Diet members.
- **Chair:** Mr. Kaoru Yosano (former Cabinet Secretary, Minister of MEXT, METI,,)
- **Secretary:** Mr. Takeo Kawamura (former Minister of MEXT)



2006

June Foundation of the Federation

Sep. KEK visit of the Federation members



**2007**

**Jan. ~ May --- a series of Workshop (1<sup>st</sup> – 7<sup>th</sup>)**

**Lecture by prominent physicists, economists, industry sector, etc.**

June ~Nov. Discussion on the preliminary report by Federation

**Nov. Publish preliminary report (1<sup>st</sup> summary report)**

2008 Jan. Start of the next workshop series

English Version in

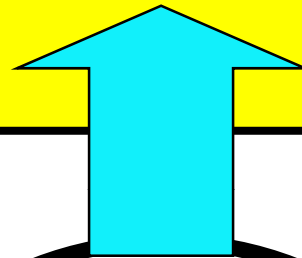
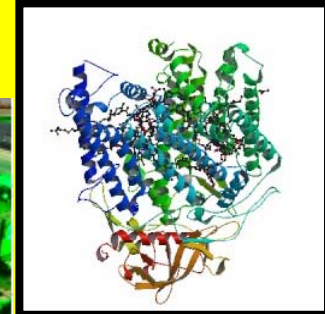
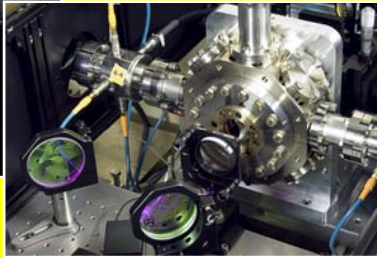
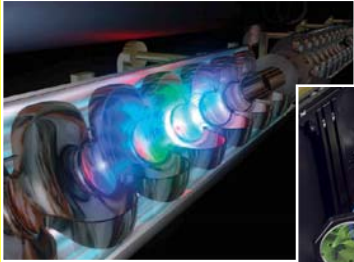
[http://suchix.kek.jp/~tishika/ilc\\_report/](http://suchix.kek.jp/~tishika/ilc_report/)

user ID = *ILC* password = *ilc777*



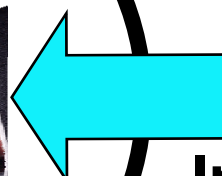
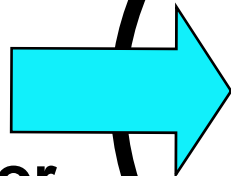
# Accelerator Technology

## Innovation



KEK

Best Knowledge  
and Expertise  
from the  
Academic Sector



Best Knowledge  
and Expertise  
from the  
Industrial Sector

The world best  
joint-research center

KEK  
University



Industry

**The First Symposium of  
Frontier Accelerator Technology Cooperation**  
*Feb. 27, 2008 @ Tsukuba*

~220 participants  
(1/2 from industry)



# Conclusions

