



Belle II
IFIC-Valencia



SuperKEKB Project



KEK

High Energy Accelerator Research Organization



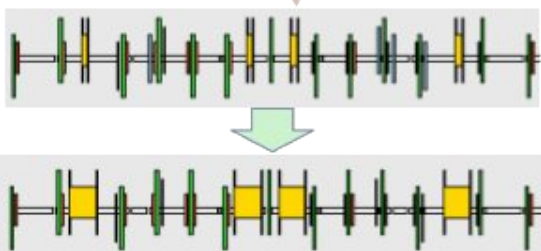
SuperKEKB Collider

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Approved in 2010.

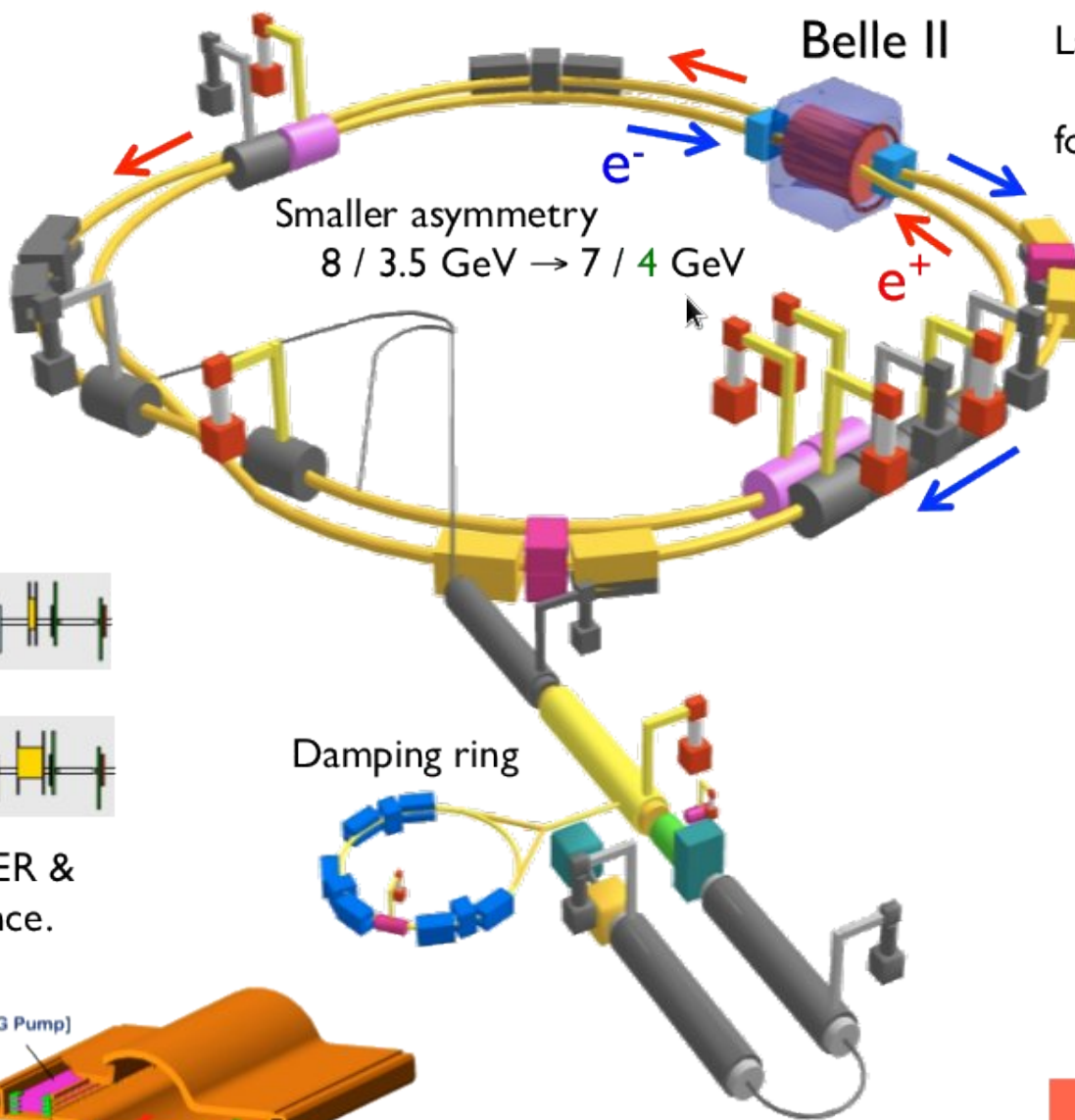
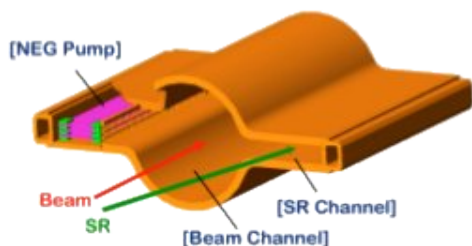


Replace short dipoles with longer ones (LER).



Redesign the lattices of HER & LER to reduce the emittance.

TiN coated beam pipe with antechambers



Smaller asymmetry
8 / 3.5 GeV → 7 / 4 GeV

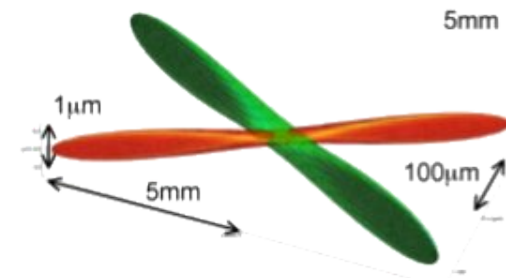
Larger crossing angle
 $2\phi = 22 \text{ mrad} \rightarrow 83 \text{ mrad}$
for separated final-focus magnets.

High currents

e^- : 2.6 A
 e^+ : 3.6 A

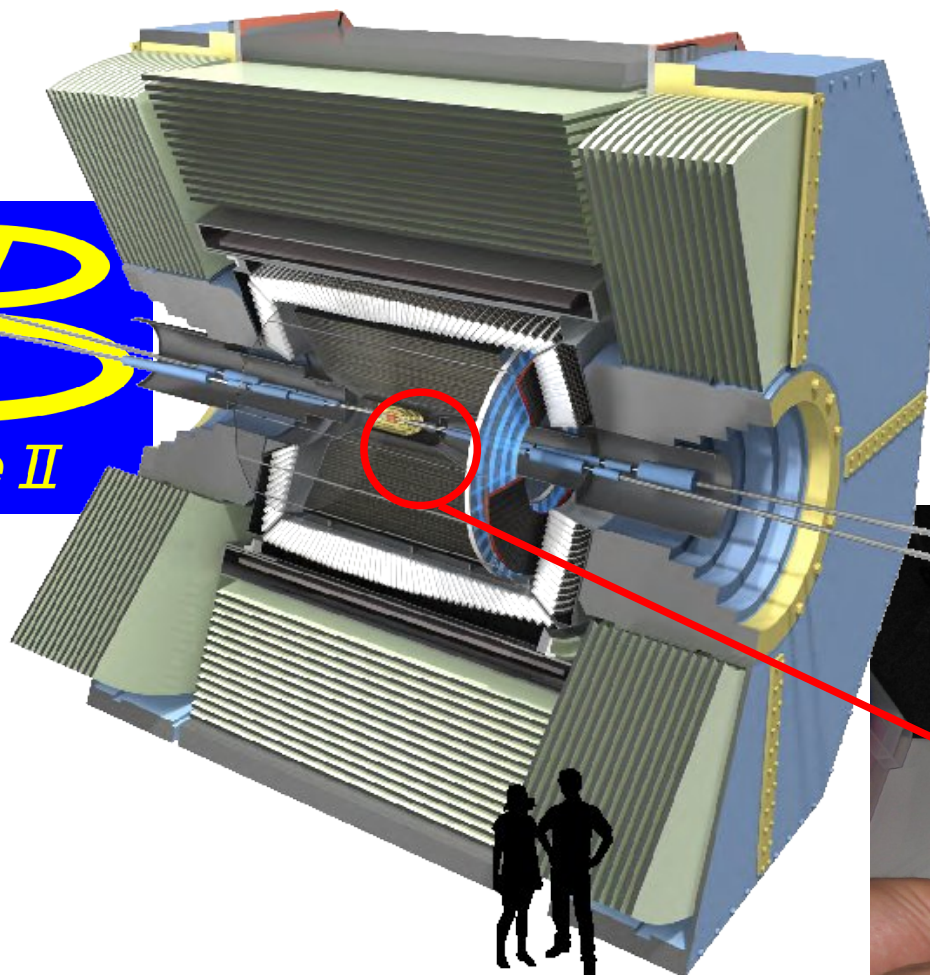
Small beam sizes

$\sigma_x \sim 10 \mu\text{m}$, $\sigma_y \sim 60 \text{ nm}$

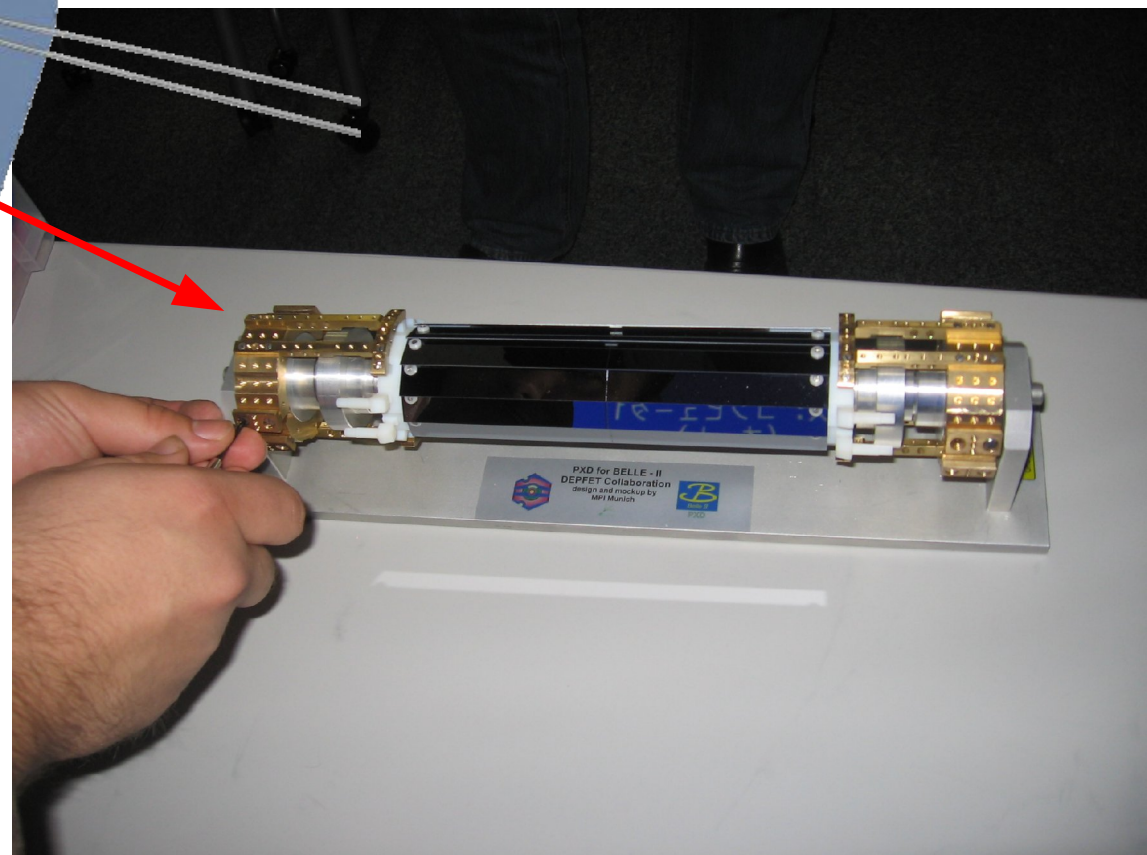


$$\mathcal{L} = 8 \times 10^{35} \text{ cm}^{-2} \text{ s}^{-1}$$

Belle II PXD – The DEPFET “detour”



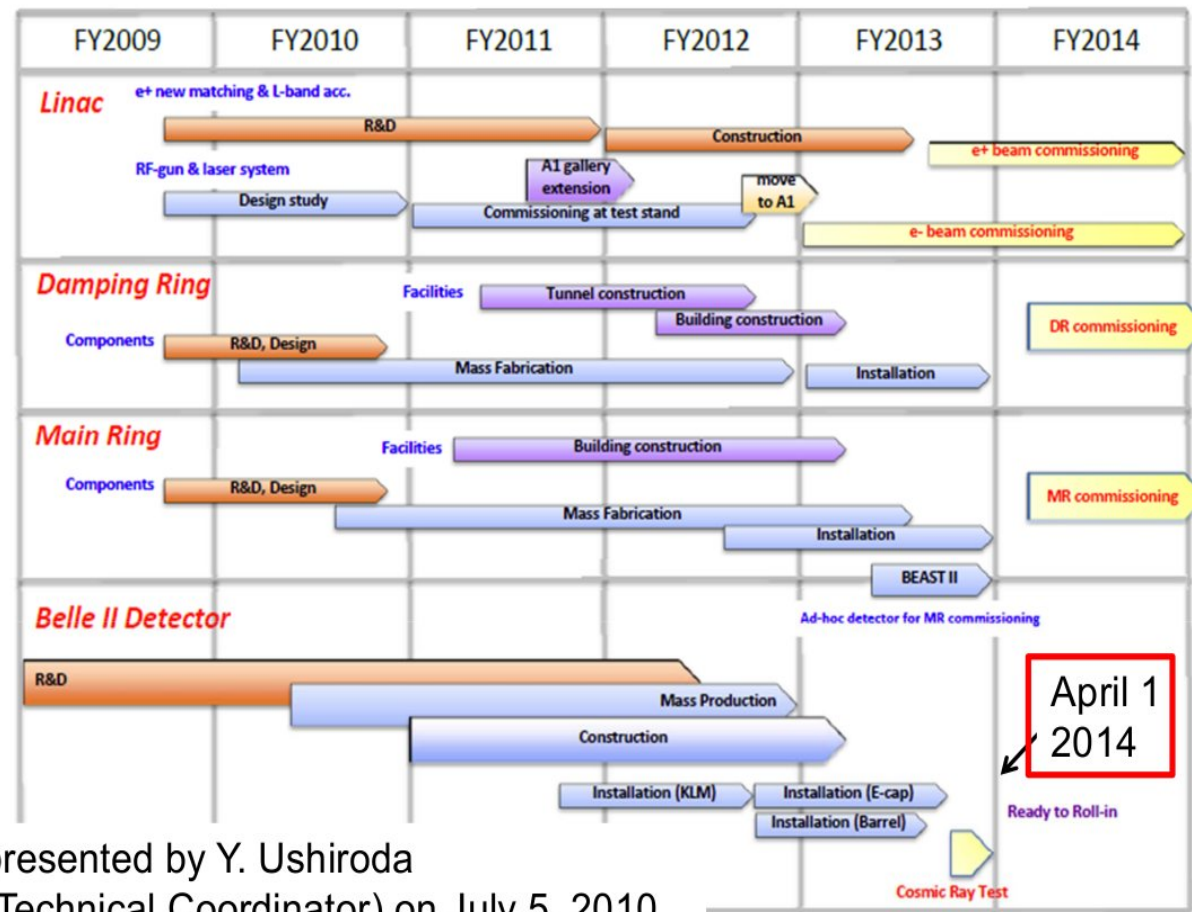
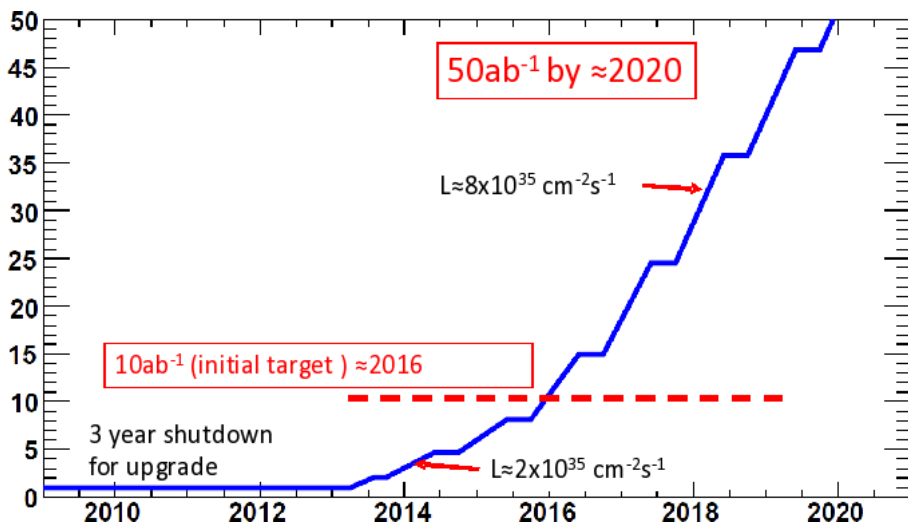
- ✓ End 2007: Possibility of building the vertex detector for Belle II at SuperKEKB
- ✓ Mid 2008: DEPFET chosen as baseline technology for Belle II at SuperKEKB.



From a long term project (ILC) to a real project with prospects of becoming a real DEPFET system

The DEPFET “detour”

- ✓ Activities focused on design and construction of Belle II vertex detector
 - ➔ Spanish Armada in charge of keeping DEPFET alive in FLC community and
 - ➔ Participate in the design and construction of the **PXD@Belle II**
- ✓ Changed from R&D phase to **production mode**
- ✓ A tough schedule ahead



presented by Y. Ushiroda
(Technical Coordinator) on July 5, 2010

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大学共同利用機関法人
KEK
 高エネルギー加速器研究機構

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last update: 10/06/23

Press Release

KEKB upgrade plan has been approved

June 23, 2010
 High Energy Accelerator Research Organization (KEK)

The MEXT, the Japanese Ministry that supervises KEK, has announced that it will appropriate a budget of 100 oku-yen (approx \$110M) over the next three years starting this Japanese fiscal year (JFY2010) for the high performance upgrade program of KEKB. This is part of the measures taken under the new "Very Advanced Research Support Program" of the Japanese government.

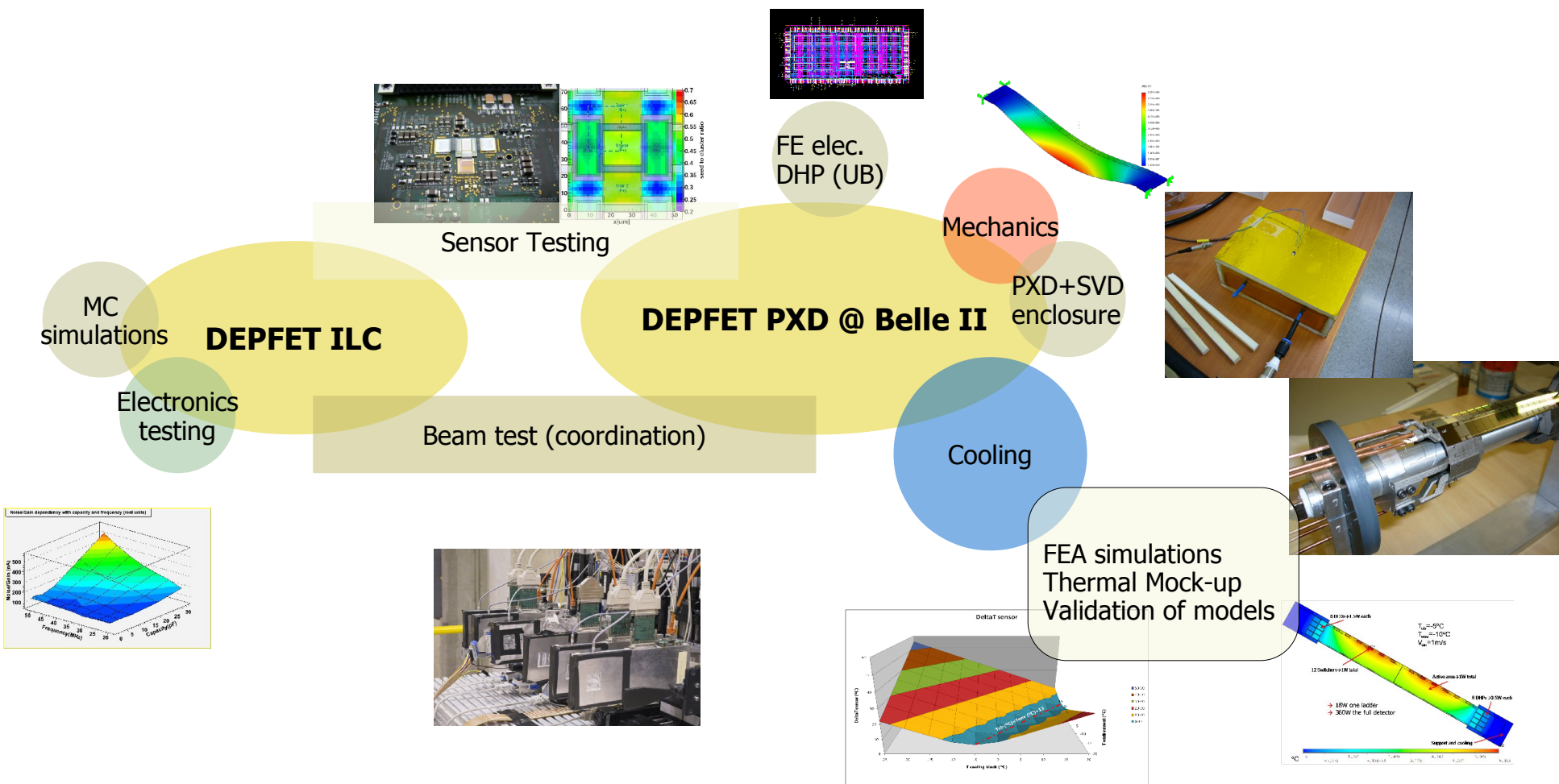
"We are delighted to hear this news," says Masanori Yamauchi, former spokesperson for the Belle experiment and currently a deputy director of the Institute of Particle and Nuclear Studies of KEK. "This three- year upgrade plan allows the Belle experiment to study the physics from decays of heavy flavor particles with an unprecedented precision. It means that KEK in Japan is launching a renewed research program in search for new physics by using a technique which is complementary to what is employed at LHC at CERN."

Official Statement (by M. Yamauchi beg. Of May 2011):

The ***SuperKEKB*** project was **fully approved by the Japanese Government at the end of March** in spite of the tragic disaster, although we had to postpone the groundbreaking ceremony to announce this official start of the project. The damage to the facility was not serious at KEKB and Belle, and no major delay in the overall schedule of SuperKEKB is expected as a consequence of the earthquake.

The Spanish contribution

- ✓ We have been members of the DEPFET collaboration since 2003
- ✓ Initial focus was the development of a valid vertex technology for the ILC detectors
- ✓ Soon the collaboration focused on the Belle II vertex detector and so we did
 - ILC activities were kept at an adequate level
- ✓ UB, URL and USC joined the collaboration in 2008. Today only UB remains



Quo vadis ?

Eo "Belle Upgradem" iterum crucifigi.

- ✓ We have participated in a set of activities which span many of the system issues of the Belle II PXD
 - Up to now, no clear interest nor activities in Physics exploitation.
- ✓ We are started with 2011 a new FPA project.
PXN should be about to be installed at the end of that project
- ✓ Time to think where we go from now on given that:
 - USC and URL left DEPFET
 - UB will fulfill their commitments during the next 3 years.
 - ↳ No interest in physics exploitation of Belle II, yet
 - IFIC will fulfill their commitments and participate during the installation
- ✓ This has been an uncomfortable situation both for IFIC and, to some extent, the DEPFET colleagues.
- ✓ **IFIC-Valencia joined the Belle II (April 8th)**
 - We invite any other group interested in Flavour Physics and the Belle II detector to also join the collaboration to increase the "specific weight" of the Spanish groups in the collaboration
 - We do not discard