

On receiving
2019 Toshiko Yuasa award
2019 TYL-FJPPL Female Scientist Prize

Mika Masuzawa (KEK)

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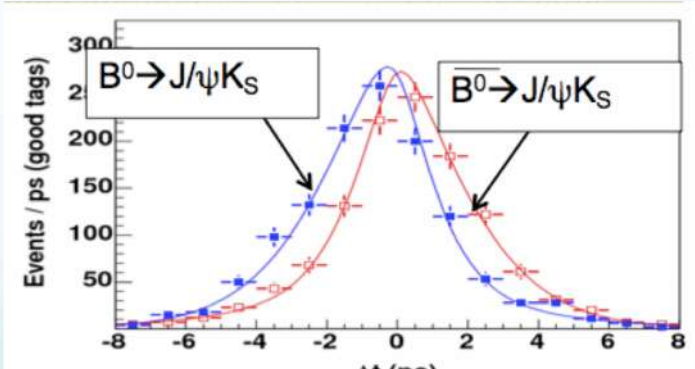
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SuperKEKB

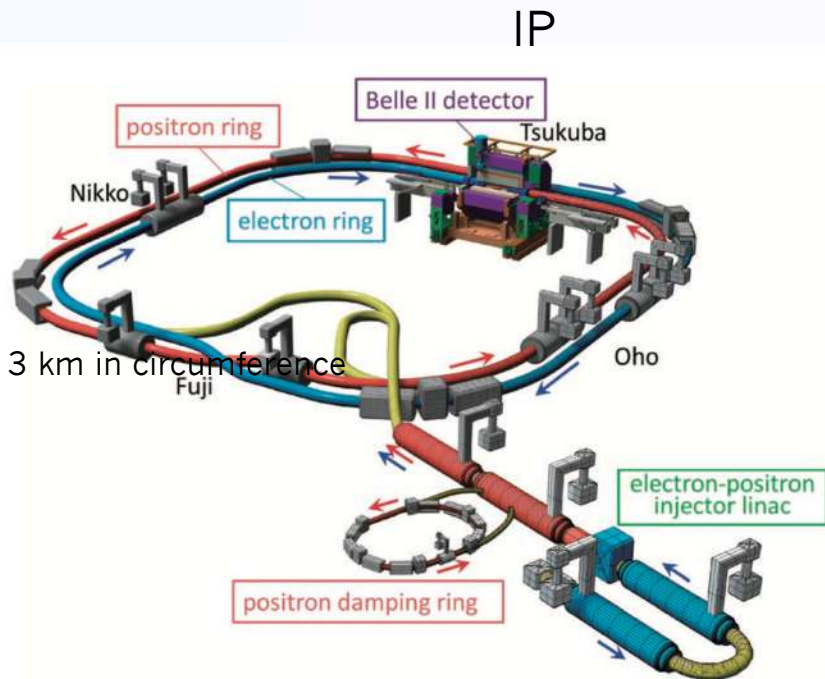
The next generation B-Factory accelerator



The previous KEKB B-Factory and the Belle detector demonstrated the violation of CP symmetry proposed by Dr. Kobayashi and Dr. Maskawa. They received the 2008 Nobel Prize in Physics.



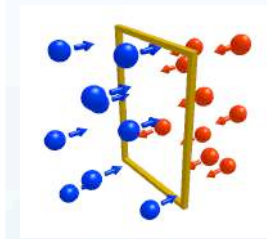
SuperKEKB
 $e^+(4 \text{ GeV}) e^-(7 \text{ GeV})$ double ring collider
 Generating many B-mesons @ $E_{\text{cm}} = 10.58 \text{ GeV}$



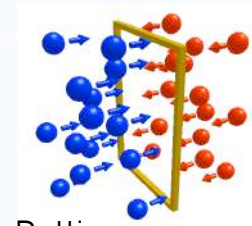
Key word : Luminosity
 # of particles going through a unit area in a unit time

SuperKEKB strategies for luminosity increase

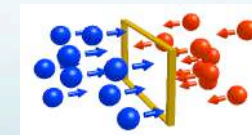
- ① Putting more particles in a bunch (high beam current)
- ② Squeezing the beam size down to $\sim 50 \text{ nm}$ in vertical



Two groups (bunches) of particles meeting at the IP



① Putting more particles



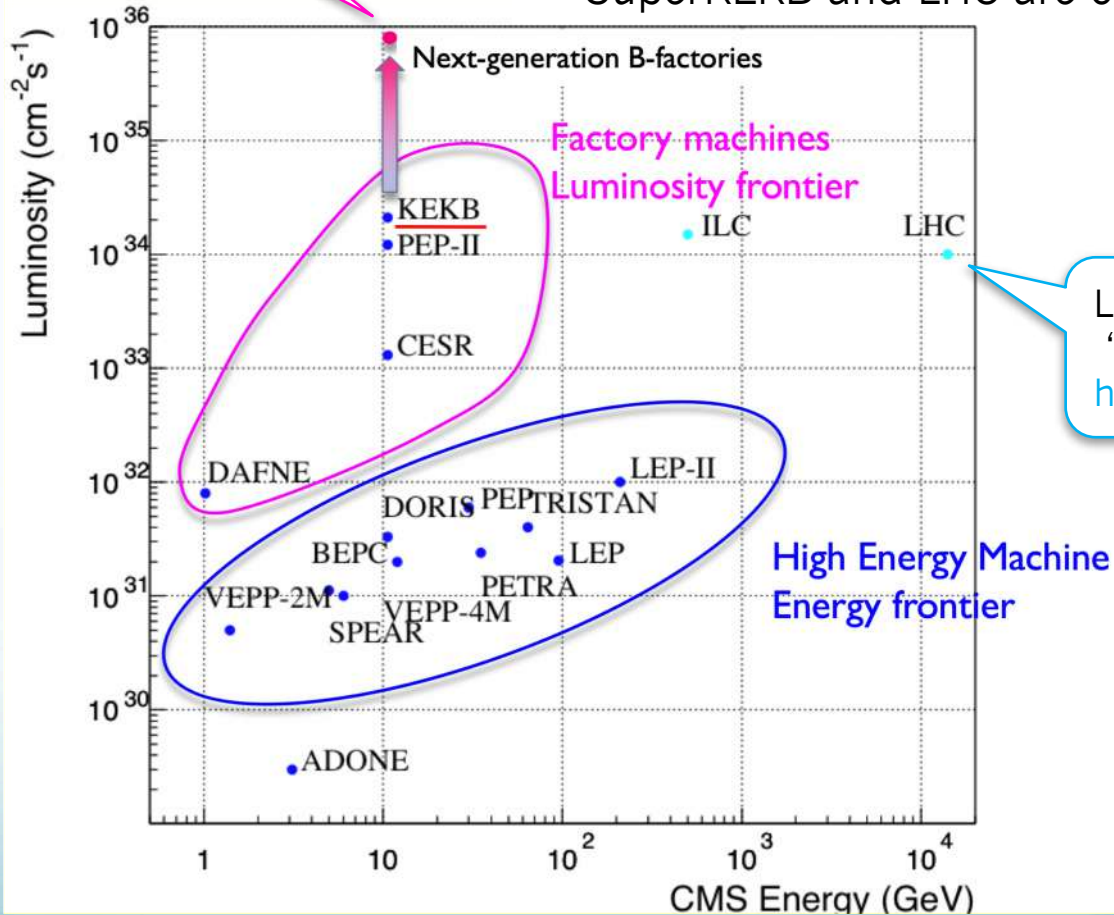
② Squeeze the beam size

Luminosity

SuperKEKB
“Luminosity frontier”,
highest luminosity

Aiming at
Peak luminosity of $8 \times 10^{35} \text{ cm}^{-2}\text{s}^{-1}$
= 40 x (KEKB)

SuperKEKB and LHC are complementary



LHC
“Energy frontier”,
highest energy

SuperKEKB Main Ring Magnet System



- The magnet system, which I am involved in, plays an important role in controlling the beam orbits and qualities.
- ~2000 magnets (& power supplies to run the magnets) were designed, fabricated, evaluated by precision field measurement, installed in the tunnel and aligned precisely.
- Successful beam circulation in 2016 and first collision in 2018.
- Collision by nano-meter size beams at the IP and maintaining the good collision conditions are challenging.
- We are continuing beam commissioning to improve the machine performance to achieve the target luminosity.



TYL-FJPPL & FKPPL workshop on 10-12 May 2021

Meeting with Dr. Toshiko Yuasa

I happened to watch this TV program “The Key to the Universe” when I was a high school student.

I was always interested in the Universe, just like many of you. At one point I wanted to become an astronaut.

I learned from this TV program

At the time of lift-off the astronaut had to withstand a force of many G. Needed to have good teeth!

- There is something called “High Energy particle physics” and that this may let us find the key to the Universe!
- One of the labs shown was CNRS (Orsay?) in Paris.
- There in one photo, Dr. Yuasa was standing surrounded by tall European (of course) male scientists.
- She was talking probably about some physics without any sign of shyness or nervousness. Her dignified attitude impressed me very much.

Dr. Yuasa has become my role model since.



So I confess that my destined meeting with Dr. Yuasa was one-sided one, only via TV and later through books.

But Dr. Yuasa was certainly one of many people who made an impact in my life.



Yuasa herself.

From Women in Physics
AAPPS (Association of Asia Pacific Physical Societies)
Bulletin August 2007, Vol. 17, No. 4



Closing

I thank you for working with me and reconnecting my memories and dreams that I had when I was 17 (!) with Dr. Toshiko Yuasa, the first Japanese woman physicist, by this honorable Toshiko Yuasa Award.

I will (would like to) continue to work on various interesting topics

- fast luminosity monitors: LAL
- magnetic shielding for SRF cavities: Saclay
- ground motion: LAPP
- etc.

with you in the framework of FJPPL.