# Toshiko Yuasa Lab (TYL)

K.Trabelsi

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S.Hashimoto

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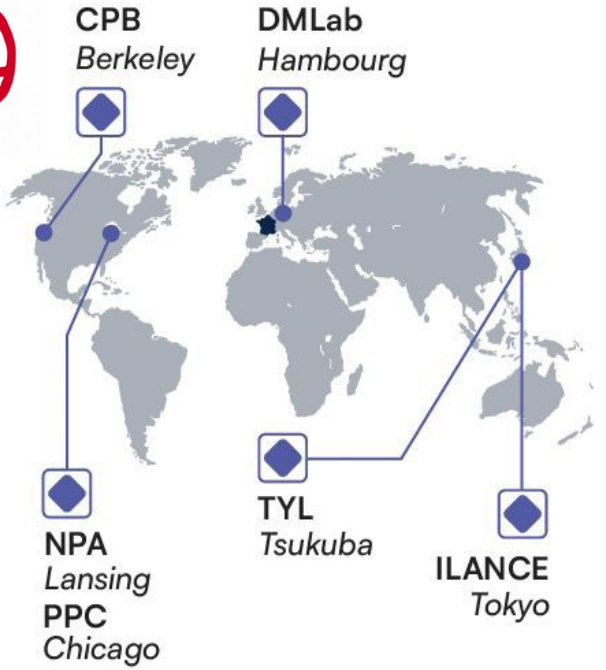
FJPPN/FKPPN workshop, May 23, 2024

L. Vacavant's talk
Wednesday morning

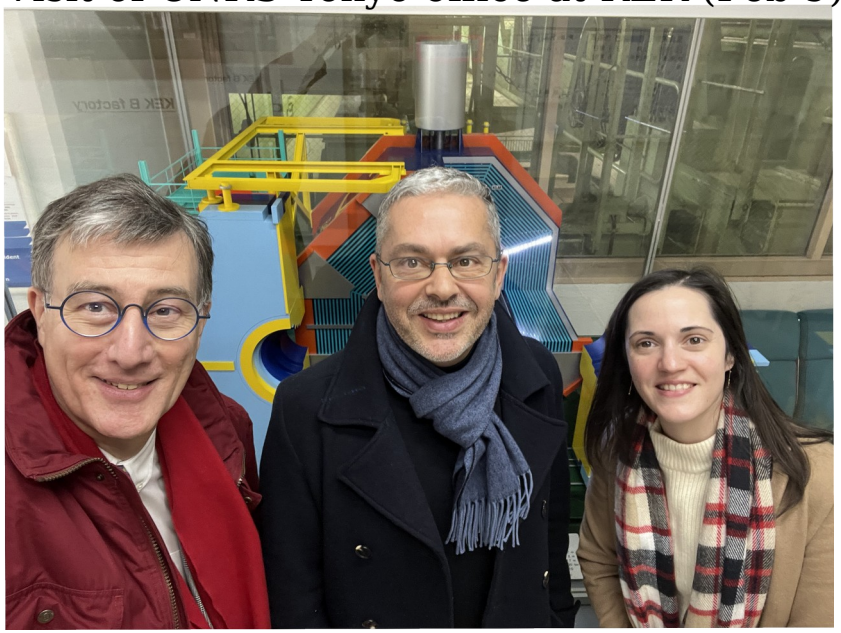
**IRL Tokyo - ILANCE**
(location: Kashiwa campus)
International Laboratory for Astrophysics, Neutrino and Cosmology Experiments
created in 2021
(M.Gonin, T.Kaajita)

**IRL KEK - TYL**
created in 2023
(K.Trabelsi, S.Hashimoto)

**France-Japan Particle Physics Network (FJPPN) IRN**
(E.Kou, S.Hashimoto)




Visit of CNRS Tokyo office at KEK (Feb 9)



- Visit of KT to CNRS Tokyo office (December 14)
- Visit of KT to ILANCE (January 18)
- Visit of J.Maleval/C.Painblanc to KEK (Feb 9)

# Presentation

Toshiko Yuasa Lab (TYL) is an IRL

What is an IRL ?

International Research Laboratories (IRL) are laboratories from CNRS located in partner universities/institutes which bring together researchers, students, post-docs, students, engineers and technicians from both the CNRS and partner institutions in other countries.

TYL, IRL at KEK, has been created last summer

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> On August 1, 2023, Centre national de la recherche scientifique (CNRS) and KEK created the International Research Laboratory called “Toshiko Yuasa Laboratory (TYL)”. The agreement with CNRS to jointly establish this Toshiko Yuasa Laboratory was reached in order to further strengthen what has been conducted as a bilateral research activity between French and Japanese teams since 2006. TYL is a research center between CNRS and KEK located at KEK Tsukuba Campus to promote the collaboration regarding to accelerator R&D and accelerator-based experiments, such as the Belle II experiment .
>
> The Director is Dr. Karim TRABELSI from IN2P3 affiliated to CNRS and Co-Director is Dr. Shoji HASHIMOTO from IPNS of KEK. This laboratory will strengthen cooperation between the two countries and promote research activities.

KEK news

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KT (as director) and Shoji Hashimoto (as co-director)
administration: Tomoko Numata/Camille Painblanc

Activities in different sectors (list of PIs)

| | | |
|---|---|---|
| Intensity Frontier (Yutaka Ushiroda/Cristina Carloganu) | Energy Frontier (Kunihiro Nagano, Roman Poeschl) | Cosmic Frontier (Tijmen de Haan, Matthieu Tristam) |
| Theory Frontier (Shoji Hashimot, Emi Kou) | Detector R&D (Ken Sakashita, Jerome Baudot) | Accelerator R&D (Aryshev Alexander, Angeles Faus-Golfe) |

# Activities at KEK (IPNS)

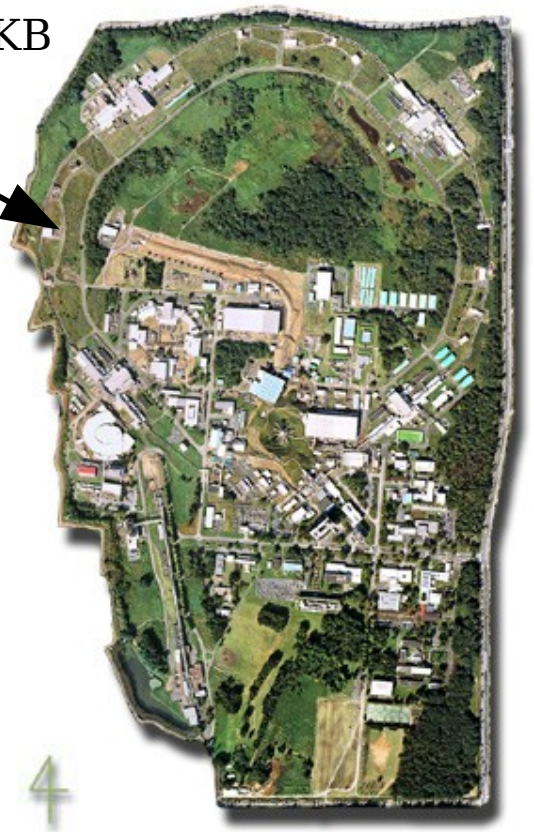
Saito san's talk
Wednesday morning

# KEK

## High Energy Accelerator Research Organization



Accelerator (Super)KEKB
circumference 3 km



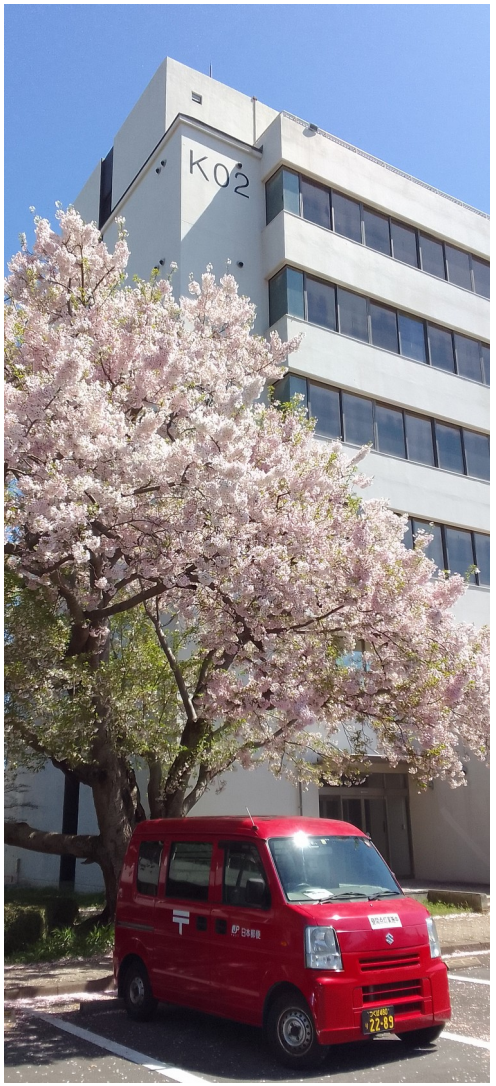
- Tsukuba, Japan
- Largest Accelerator Facility in Japan (in Asia ?)
- Institute for High Energy Physics (Particle Physics)
- Various researches using accelerators are being done (Universe, Matter, Life)

# Location at KEK

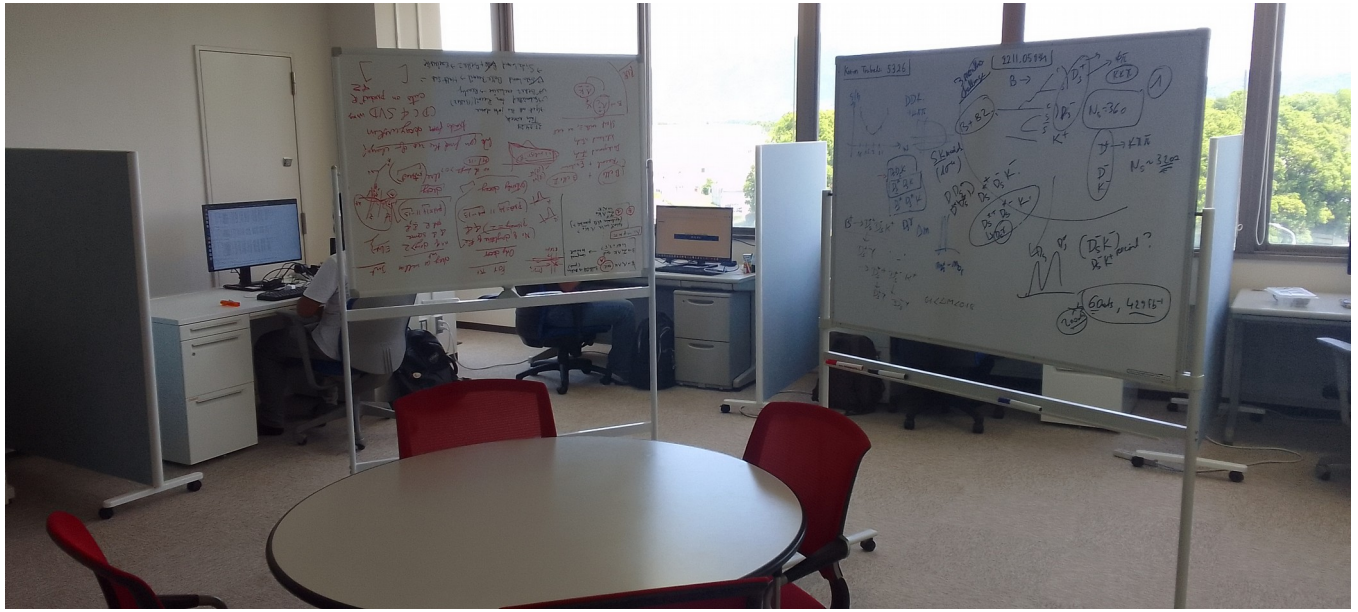
- Location: 2-gokan, room 401-402

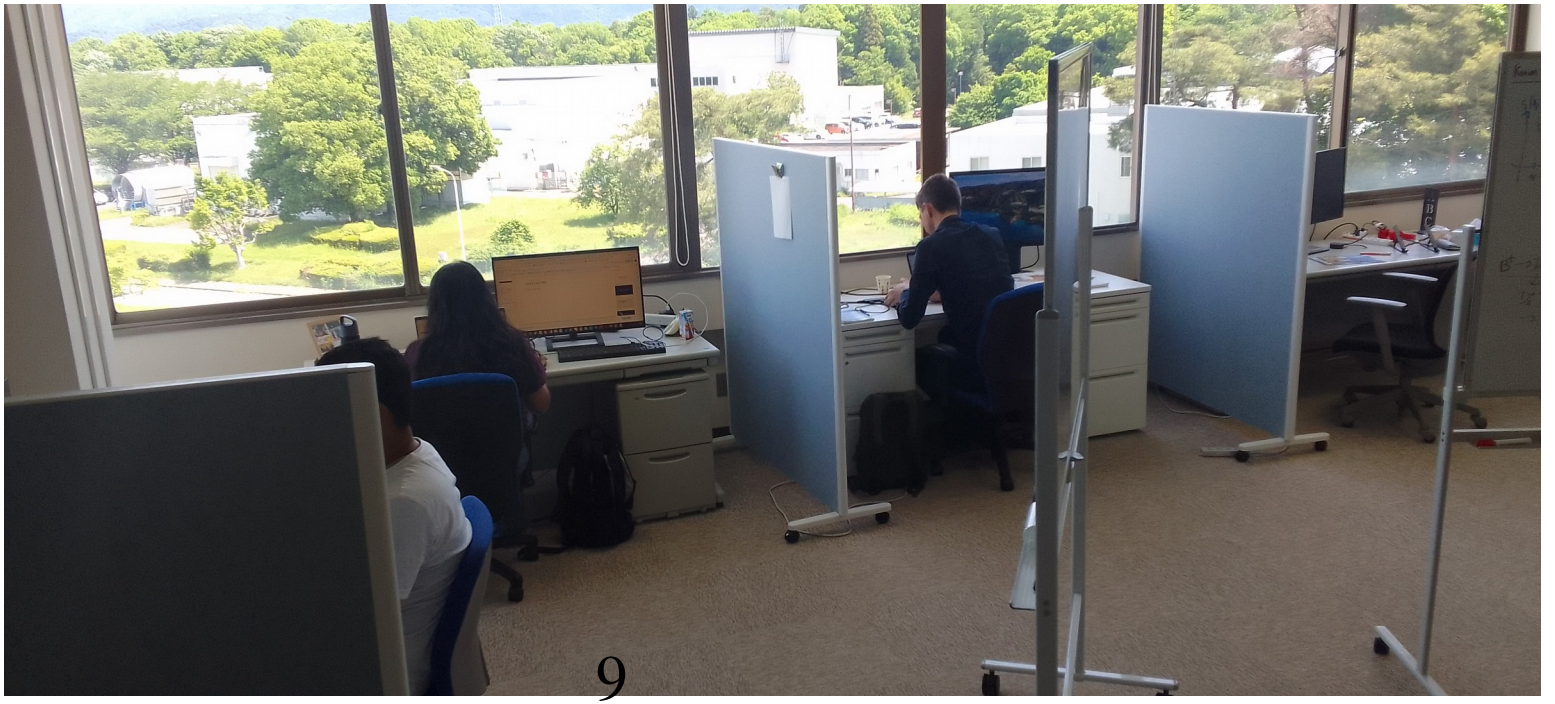
shared office with MNPL: Multi−national Parternship Laboratory

CERN/TRIUMPH office




new desks/chairs/displays/boards
pleasant/clean work environment (completely renovated in Nov 2023)
(many thanks to Takahiro Koyama/Nobutake Niita)





# pleasant/clean work environment (completely renovated in Nov 2023)
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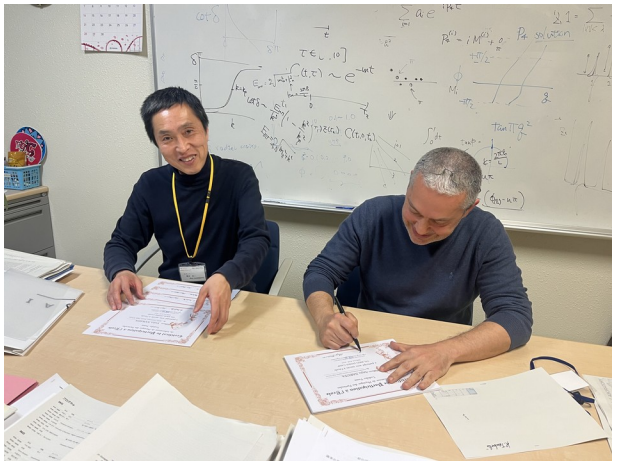
credits: Ms Swarna Mahrana

# Location at KEK

... with a splendid view on Tsukuba san

# Participation to events at KEK

**Female High School Students Workshop (April 2024)**



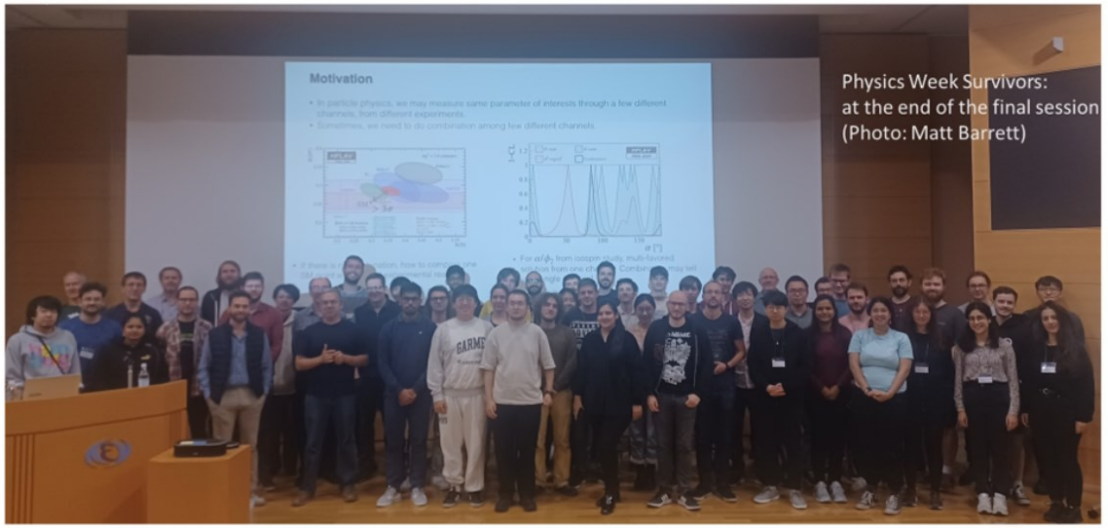
Speaker: Yasmine Amhis (IJCLab)
KEK IPNS Physics Seminar LHCb (April 10th)

**KEK Summer Student Program 2024**

The duration of stay is up to 8 weeks from middle of June to middle of August. In the case of the theory group, the maximum period is 4 weeks. The actual period will be discussed and decided after the selection.

⇒ Selected French candidate (Sophie McNeill)
her stay will be supported by TYL

**Physics Week (School + Workshop for Belle II during Fall)**




Last year, on $|V_{cb}|$ measurement (~ 120 participants, 20 theorists)
Next edition (Oct 14-18, 2024) on τ physics and Dark Sector
lecturers/speakers: Olcyr Sumensari (IJCLab), Sasha Davidson (Montpellier)...

# Current list of stays supported by TYL

- **Meng Li (IJCLab) - PhD student at Belle II**
  **(stay 2 months: May - June)**

on injection-related beam loss and background measurement and simulation, as well as on luminosity monitoring and studies (LumiBelle2, ZDLM)

- **Matteo Maushart (IPHC) - M2 internship project on Belle II Trigger**
  **(stay 2 months: July - August)**

work on the Belle II trigger system partly with the current detector and partly in anticipation of an upgrade

- **Post-doc (IJCLab) - subject proposed by Iryna Chaikovska**
  **(stay 2 months: Nov - December)**

on high-intensity positron sources for the Future Circular Collider (FCC-ee) extension of the current efforts on simulation tools and benchmarking of simulation models, using the SuperKEKB positron source.

- **PhD (IJCLab) - subject proposed by Angeles Faus-Golfe**
  **(stay 2 months: Nov - December)**

on exotic IR design at FCC-ee

# Participation in Belle II

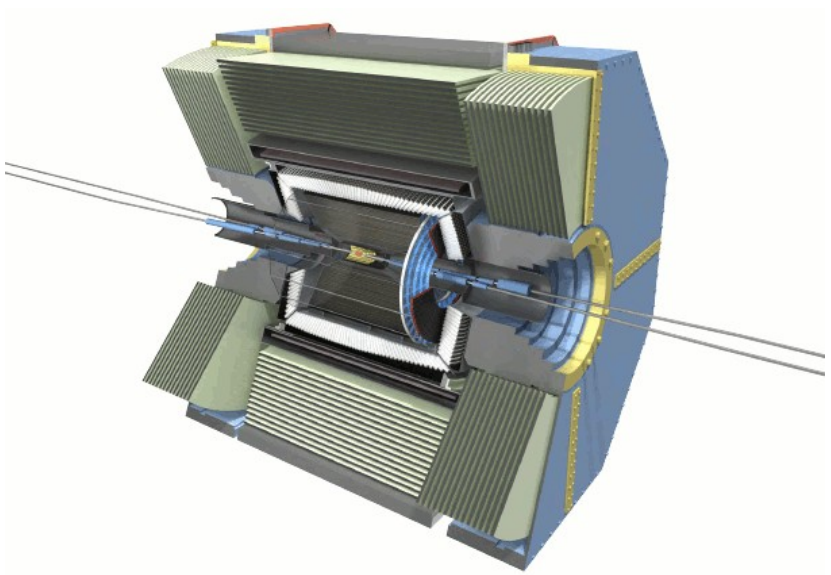
**(approved at Belle II collaboration meeting Feb 2024)**

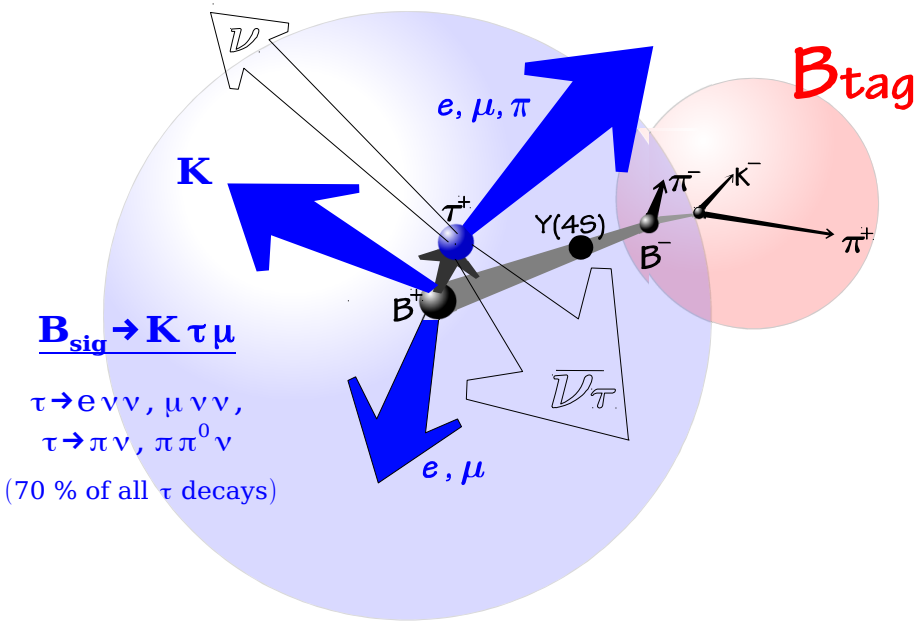
- TYL new group on Belle II
- currently I'm the only staff member with involvement in Belle II, allows me to stay at KEK during Belle II spokesperson's mandate
- IN2P3 post-doc founded, will be selected and start from Fall 2024
  https://inspirehep.net/jobs/2775795
- host any IN2P3 colleague for long stays
- M&O handled at a national level rather than institutionally, so addition of TYL does not significantly change situation
- service/authorship contributions will be consistent with previous activities (HLT, tracking, B-tagging, search for rare B decays with missing energy, hadronic B decays measurements...)

# Many visitors around our Belle II activities

**Many interesting B-physics studies involve missing energy**

**$B \to D^{(*)} \tau \nu$, $K^{(*)} \tau l$, $K^{(*)} \tau \tau$, $K^{(*)} \nu \nu$, $\pi l \nu$, $\tau l$, $\tau \tau$, $\tau \nu$, $\mu \nu$ ....**






$B_{sig} \to K \tau \mu$

$\tau \to e \nu \nu$, $\mu \nu \nu$,
$\tau \to \pi \nu$, $\pi \pi^0 \nu$
(70 % of all $\tau$ decays)

- Cheolhun Kim (Hanyang/Korea), $B \to \tau \tau$ (visit Jan-Feb 2024)
- Trevor Shillington (McGill/Canada), $B \to K \tau l$ (visit Feb-March 2024)
- Swarna Mahrana (IIT Hyderabad/India), B→charmed baryons (April-June 2024)
- Varsha Gautam (IIT Bubhaneswar/India), $B \to D_s D_s K$ (May-June 2024)
- Meihong Liu (Fudan University/China), $B \to K_s \tau l$ (May-June 2024)
- ...

# In short,

if you want to organize (for you or your collaborators) a long stay at KEK for your research activities, please contact us or/and our PIs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# Instrumentation Technology Development Center

ITDC

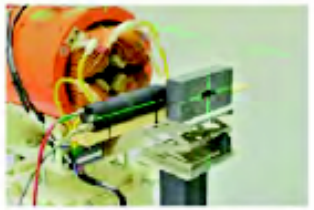
Instrumentation Technology Development Center

International Hub for instrumentation development

Promotion of Innovation and Young researches

## Inter-University Research

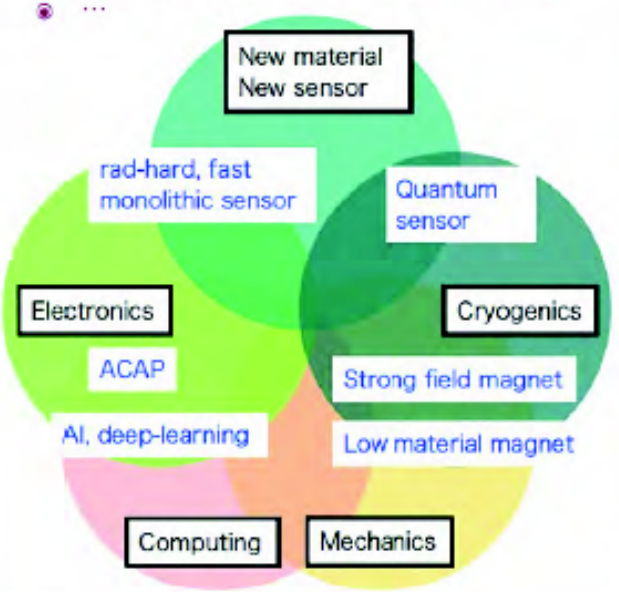
- Extension of inter-university research functions
- More efficient and faster development
  → International visibility



- Wider users by simpler system for use
  → Young researchers such as student can easily use
  → Education

## Cutting Edge Technology Development

- **Common/Core technologies for next generation projects**
  ←final application by each project
  (continue to have support function)
- Some platforms to do R&D
  - works as the interface to the community
- Technology candidates
  - Strong field magnets
  - New material semiconductor (eg. CIGS) for rad-hard
  - BiCMOS technology for high speed
  - Next generation FPGA based readout
  - …



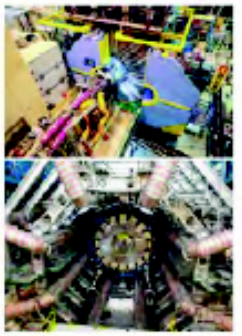

**Technology Development Platforms**

- Cryogenics
- Mechanics
- Sensor
  - Light sensor
  - semiconductor
  - gas & active medium
- Electronics
  - System integration
  - Collider Electronics
- SPADI alliance
- Computing

Platform Organization
flexible, always ready to start new one

## Researcher Community

IPNS projects



KEK projects

REBCO for HL-LHC

Education

HEP school

Industry

organic semiconductor