

# ALICE T2 site at SUT, Thailand

Chinorat Kobdaj

8<sup>th</sup> Asia Tier Center Forum  
3 September 2024  
TIFR, India



# SURANAREE

## UNIVERSITY OF TECHNOLOGY

INNOVATION AND SUSTAINABLE UNIVERSITY





- 1** SUT HOSPITAL
- 2** SURAWIWAT SCHOOL
- 3** THE REGIONAL OBSERVATORY FOR THE PUBLIC, NAKHON RATCHASIMA
- 4** BUTTERFLY PARK
- 5** SURASAMMANAKHAN HOTEL
- 6** TECHNOLIS
- 7** SYNCHROTRON LIGHT RESEARCH INSTITUTE
- 8** F 1-6 BUILDING
- 9** F 7 BUILDING
- 10** F 9 BUILDING
- 11** F 10 BUILDING

- 12** F 11 BUILDING
- 13** F 12 BUILDING
- 14** F 14 BUILDING
- 15** C 1 BUILDING
- 16** C 2 BUILDING
- 17** ADMINISTRATIVE BUILDING
- 18** SUT LIBRARY
- 19** CLASSROOM BUILDING
- 20** SPORT COMPLEX
- 21** DORMITORY ZONE

- 1** SURANAREE GATE
- 2** SITHONGCHAI GATE
- 3** WILAISILA GATE
- 4** KANLAYANAMIT GATE

- 1** SURANAPA TOWER
- 2** AMPHITHEATER





# SURANAREE UNIVERSITY OF TECHNOLOGY

INNOVATION AND SUSTAINABLE UNIVERSITY



- Located in Nakhon Ratchasima Province
- Established on 27 July, 1990
- Named after Thao Suranari, the local heroine
- One of the National Research Universities
- Specializing in science and technology
- Moving towards an *Entrepreneurial University*



## SUT Key Areas

- **Man power for the future**
- **Impactful research and innovation**
- **Sustainable development**





# QUICK FACTS

## STUDENTS

Undergraduate: 15,160  
Masters : 835  
Doctoral : 514  
Total 15,160



## STAFF

Academic Staff : 565  
Supporting Staff : 930

SUT  
Single Campus  
Area  
1,100 hectares



## INTERNATIONAL COMMUNITY

Students: 198 from  
16 countries  
Faculty : 18  
Researchers : 13



UPDATED: NOV 2023

STUDENTS [HTTP://REG.SUT.AC.TH/REGISTRAR/SUMDATA/SUMCURRENTSTUDENTS.ASP](http://reg.sut.ac.th/registrar/sumdata/sumcurrentstudents.asp)

UPDATED: FEB 2024





# QUICK FACTS



- Inst. Engineering
- Inst. Science
- Inst. Agricultural Technology
- Inst. Social Technology
- Inst. Medicine
- Inst. Nursing
- Inst. Public Health
- Inst. Dentistry
- Inst. Digital Arts and Science
- School
- University Hospital
- University Farm
- Entrepreneurship Academy
- Technopolis





# **INSTITUTE OF SCIENCE**

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**SURANAREE UNIVERSITY OF TECHNOLOGY**



**6** Schools

**33** Curricula

School of Mathematical Science  
and Geoinformatics

B.S/M.S/Ph.D.

School of Physics

B.S/M.S/Ph.D.

School of Chemistry

B.S/M.S/Ph.D.

School of Biology

B.S/M.S/Ph.D.

School of Sports Science

B.S

School of Preclinical Sciences

B.S./M.S/Ph.D.



# INSTITUTE OF SCIENCE STUDENTS



990

Students

699

Undergraduate

144

Master

147

Ph.D.

10%

International

# INSTITUTE OF SCIENCE FACULTIES



94

Faculties

9 Full Professor

25 Associate Professor

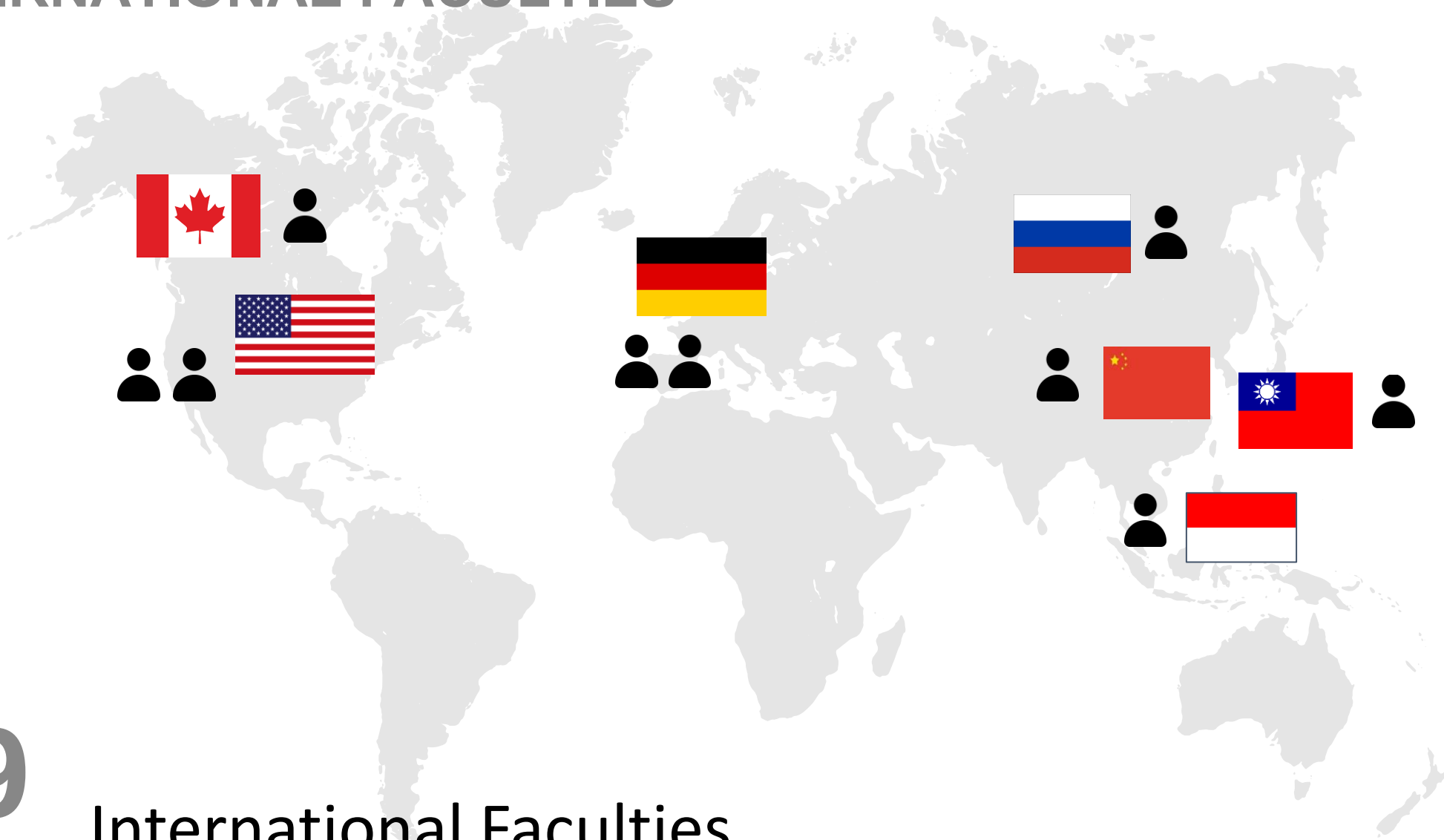
31 Assistant Professor

29 Lecturer

100%

Ph.D.

# INSTITUTE OF SCIENCE INTERNATIONAL FACULTIES



9

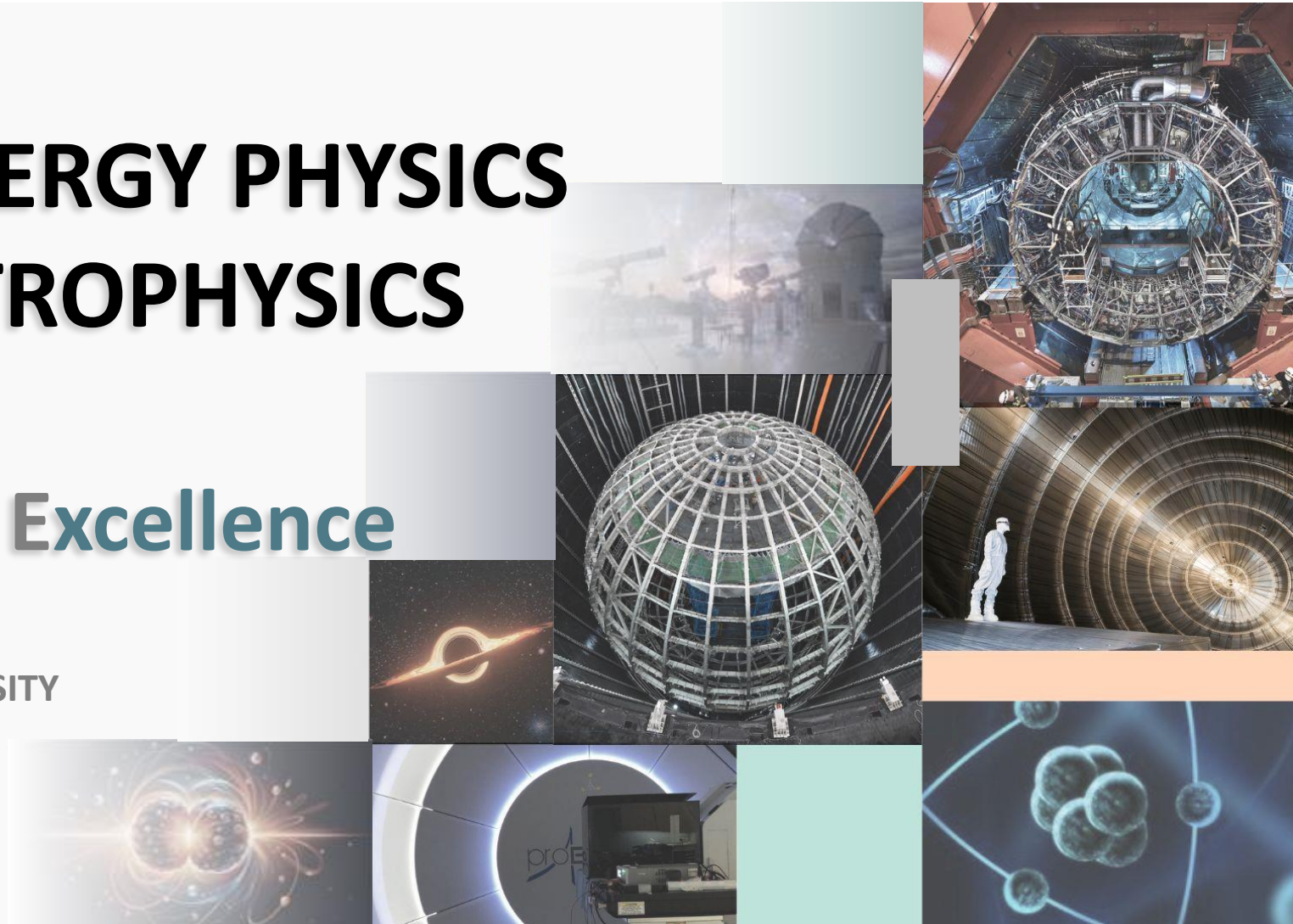
International Faculties



# HIGH ENERGY PHYSICS AND ASTROPHYSICS

## Center of Excellence

SURANAREE UNIVERSITY  
OF TECHNOLOGY



# INSTITUTE OF SCIENCE CENTER OF EXCELLENCE

INSTITUTE OF  
SCIENCE





## LARGE COLLABORATIONS



**ALICE**

**A Large Ion Collider Experiment**



**Jiangmen Underground Neutrino Observatory**



**Karlsruhe Tritium Neutrino Experiment**



**Beijing Spectrometer III**



**GSI Helmholtz Centre for Heavy Ion Research**



**Advanced Telescope for High ENergy Astrophysics**

# Our participation in ALICE

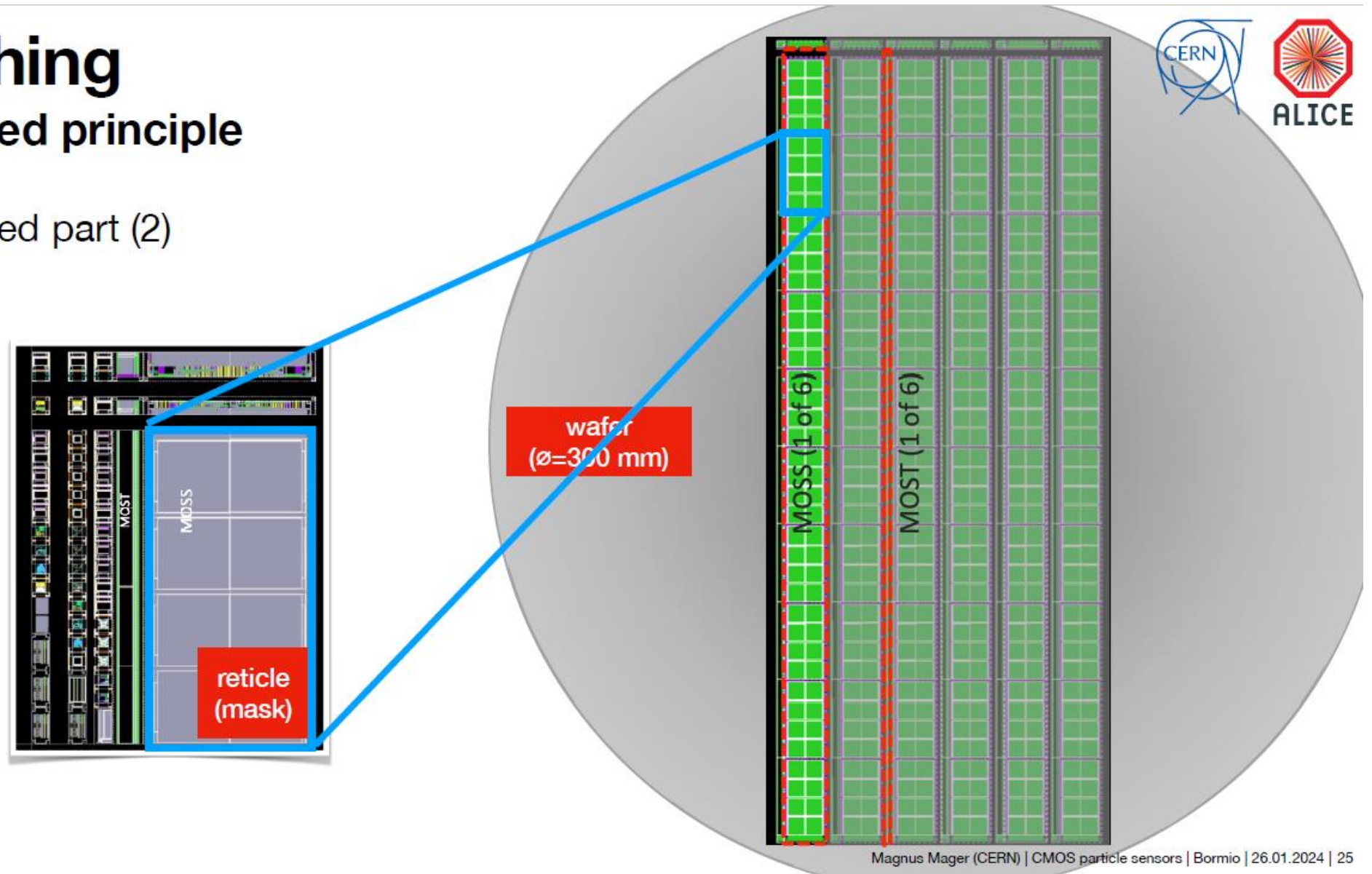
- 1) Full member since 2012
- 2) Inner Tracking System 2 upgrade: Completed.
- 3) ALICE Tier 2 site:
  - Stable, operating continuously for more than 10 years.
  - Aging and needs to be replaced.
- 4) Inner Tracking System 3 (ITS3) upgrade: Actively engaged.

**(Our budget must be allocated for all activities.)**

# Inner Tracking System 3 (ITS3)

## Stitching simplified principle

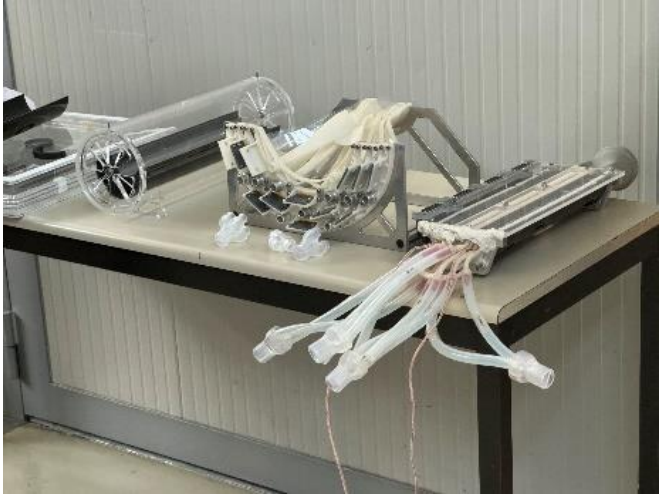
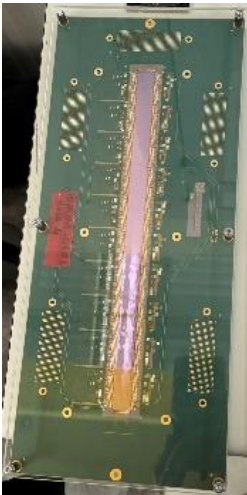
- ▶ repeated part (2)





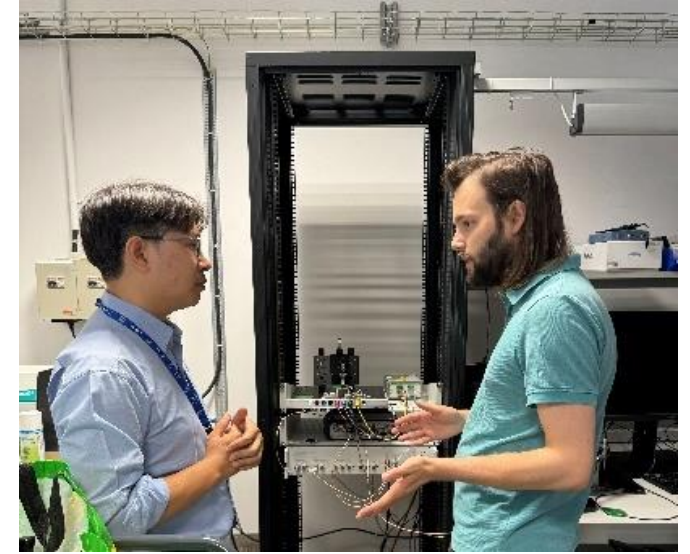
# Sensor Characterization (MLR1, APTS, baby-MOSS)

## Visit mechanical cooling lab at CERN



# Sensor Characterization (MLR1, APTS, baby-MOSS)

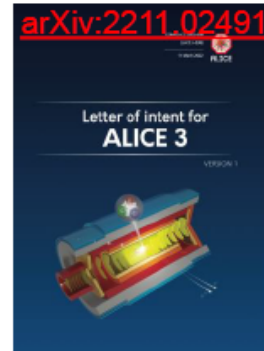
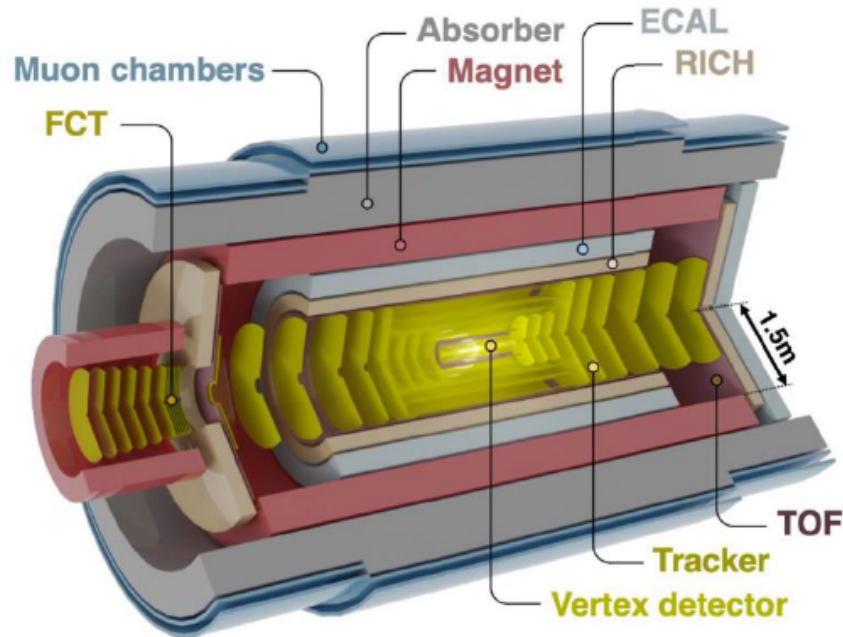
## Visit thermal lab at CERN



## Discussion for LGAD R&D with ALICE3



# The ALICE 3 Upgrade



## ALICE 3 Upgrade

a next-generation heavy-ion experiment at the LHC

→ innovative detector concept

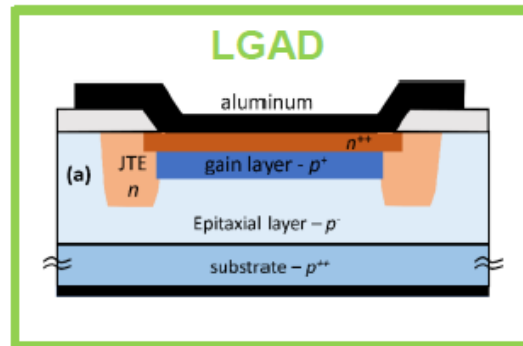
- Compact and lightweight all-silicon tracker
- Retractable vertex detector
- Extensive particle identification
- Large acceptance
- Superconducting magnet system
- Continuous read-out and online processing

See I. Altsybeev Talk

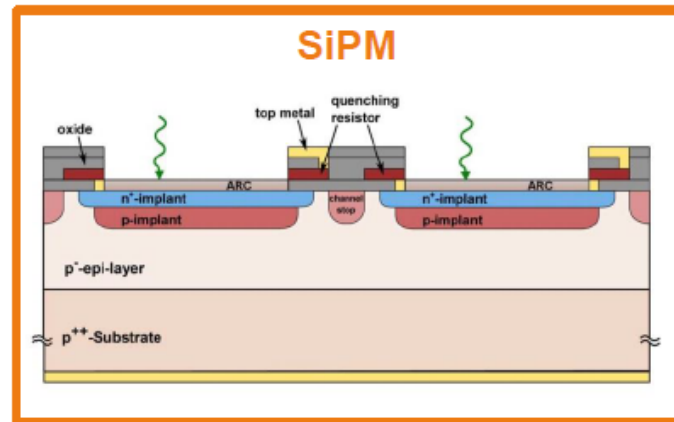
ALICE 3 main goal: access the dynamics of the strongly interacting matter produced in heavy-ion collisions

# R&D for Time Of Flight Detector

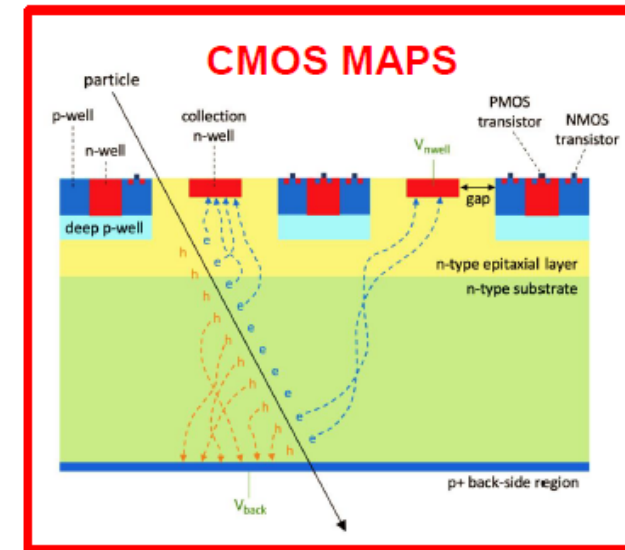
## 3 candidate sensor technologies for ALICE 3 TOF



- Timing resolution of  $\sim 30$  ps demonstrated with  $50 \mu\text{m}$  up to  $(1-2)10^{15}$   $1\text{-MeV}\cdot\text{neq}/\text{cm}^2$
- Thinner LGADs produced by different manufacturers



- Timing resolution of 40 ps for single photons detection so far
- Very promising results on MIP detection
- Dark count issue  $\rightarrow$  no radiation hardness

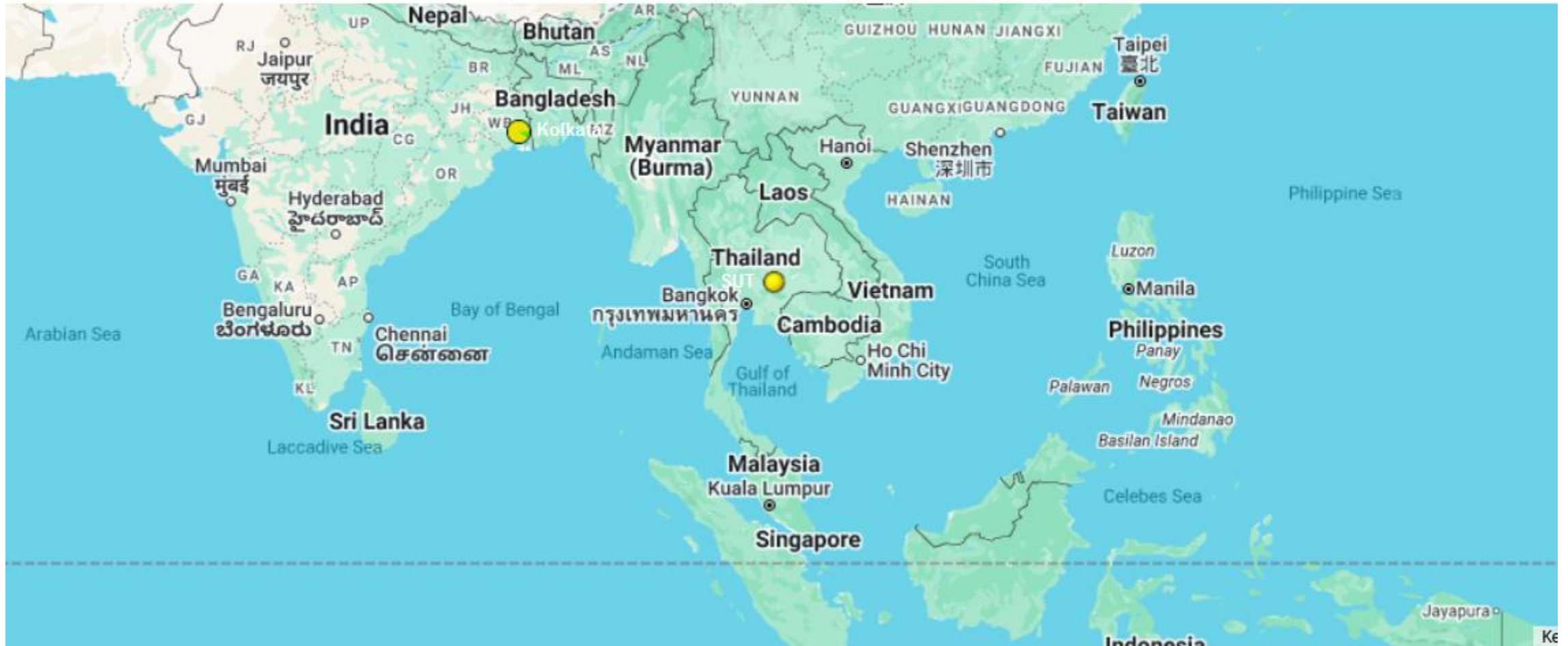


- Low material budget
- Cheap and easy assembly
- Low power
- Investigation on innovative design to proof timing performance

# SUT ALICE site report



MonALISA Repository for ALICE

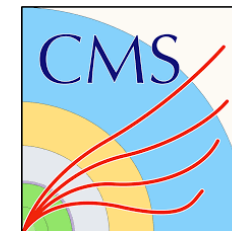


## **ALICE tier 2 plan at SUT**

- 1) Wait for confirmation from a Thai funding agency by the end of 2024.**
- 2) Start the procurement process in January 2025.**
- 3) Begin installation and configuration right after all the hardware arrives.**
- 4) Decommission the current ALICE Tier 2**

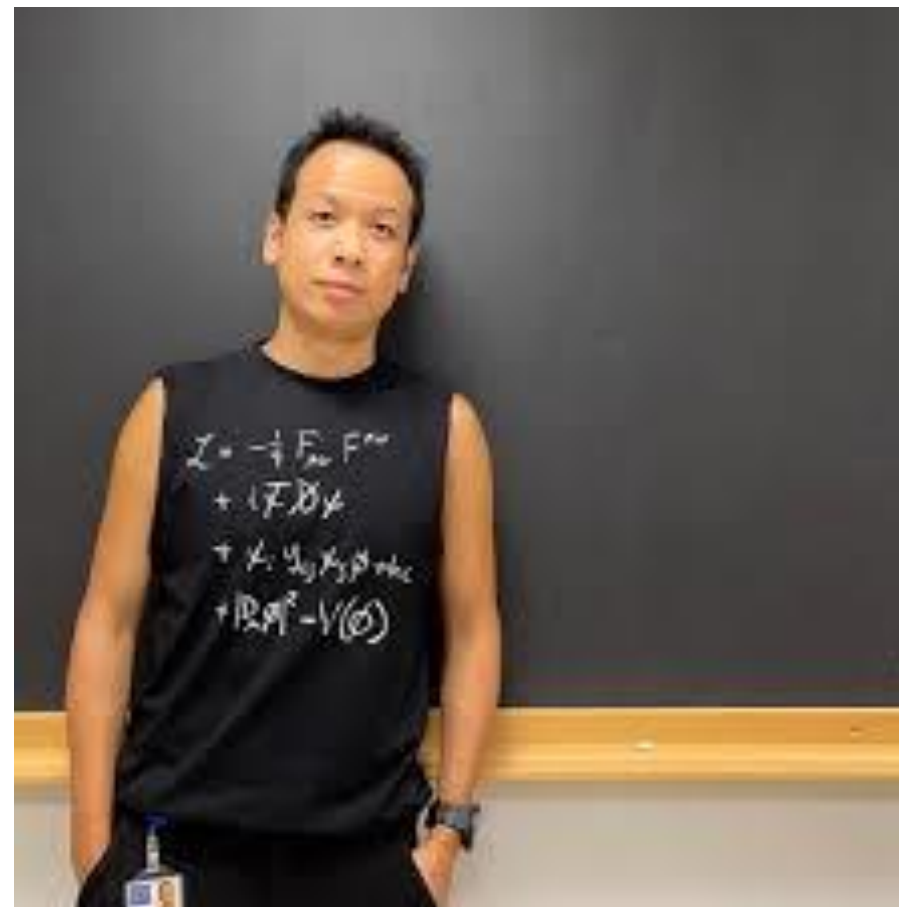


## Other Thailand activities



### **Norraphat Srimanobhas**

from department of physics, the  
Faculty of Science at  
Chulalongkorn University, **will**  
**serve as a CMS Offline and**  
**computing coordinator.**







**We plan to host ICHEP 2028 in Bangkok. Thanks to Chayanit Asawatangtrakuldee from department of physics, the faculty of science at Chulalongkorn University.**



[https://thailand.go.th/issue-focus-detail/002\\_006-2-2](https://thailand.go.th/issue-focus-detail/002_006-2-2)

Q&A

**GANESH CHATURTHI 2024**

**Ganesha  
Chaturthi in 2024**

**07**

**September, 2024  
(Saturday)**