



Particle physics research at home



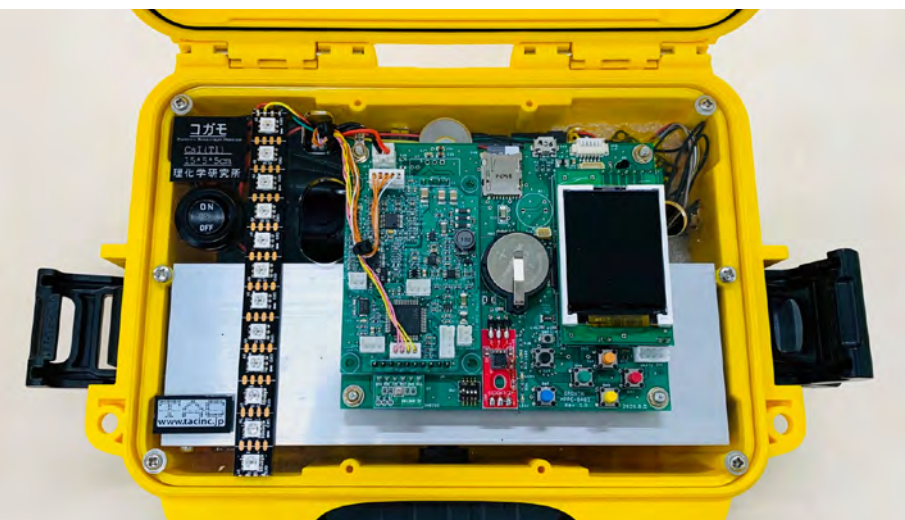
# Accel Kitchen



Waseda University / Accel Kitchen  
Kazuo Tanaka



COGAMO 2



OSECHI (Colab)



CRMD (Quarknet) 6



CW ~300



radiacode 6



S'Cool LAB 2



Cosmic Hunter 1



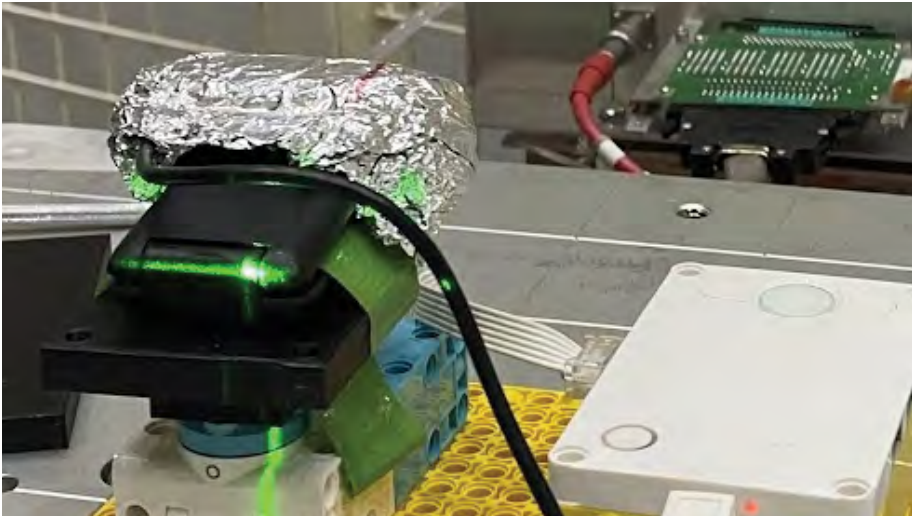
CosmicPI 1



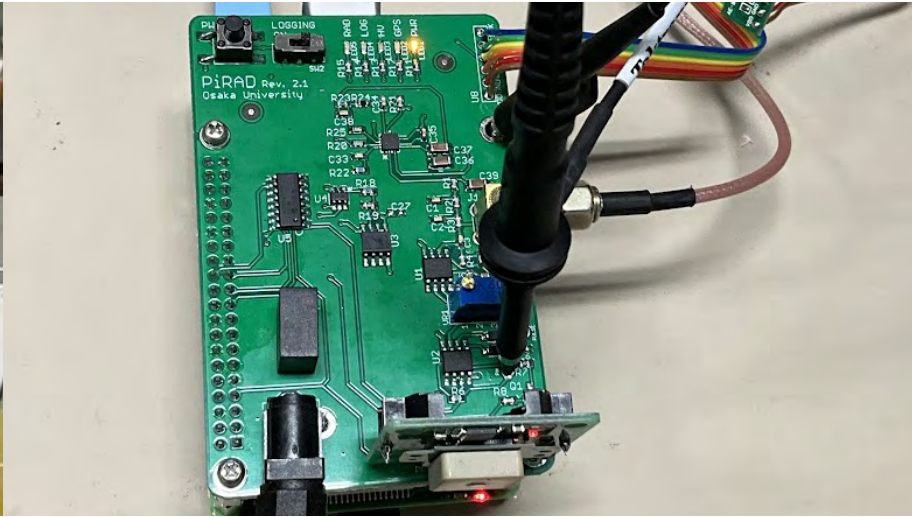
USB gamma 2



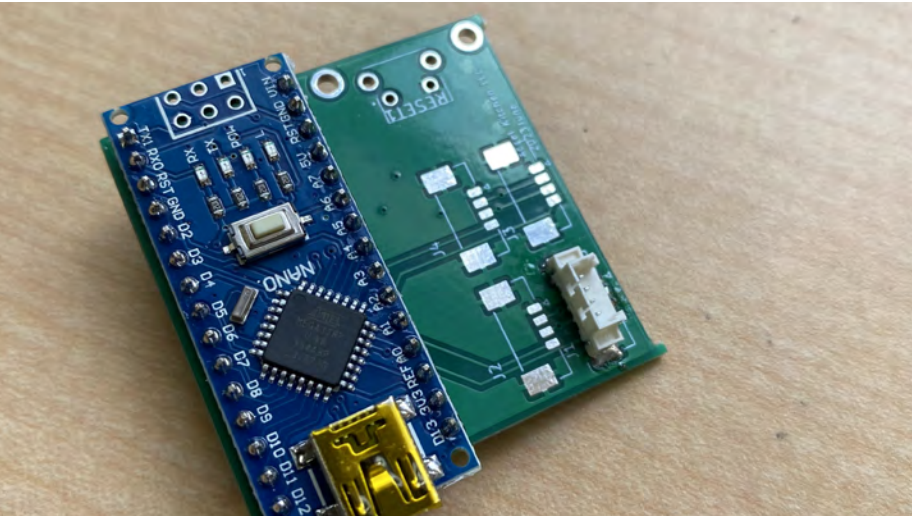
webcam det. 5



pirad (under dev.)

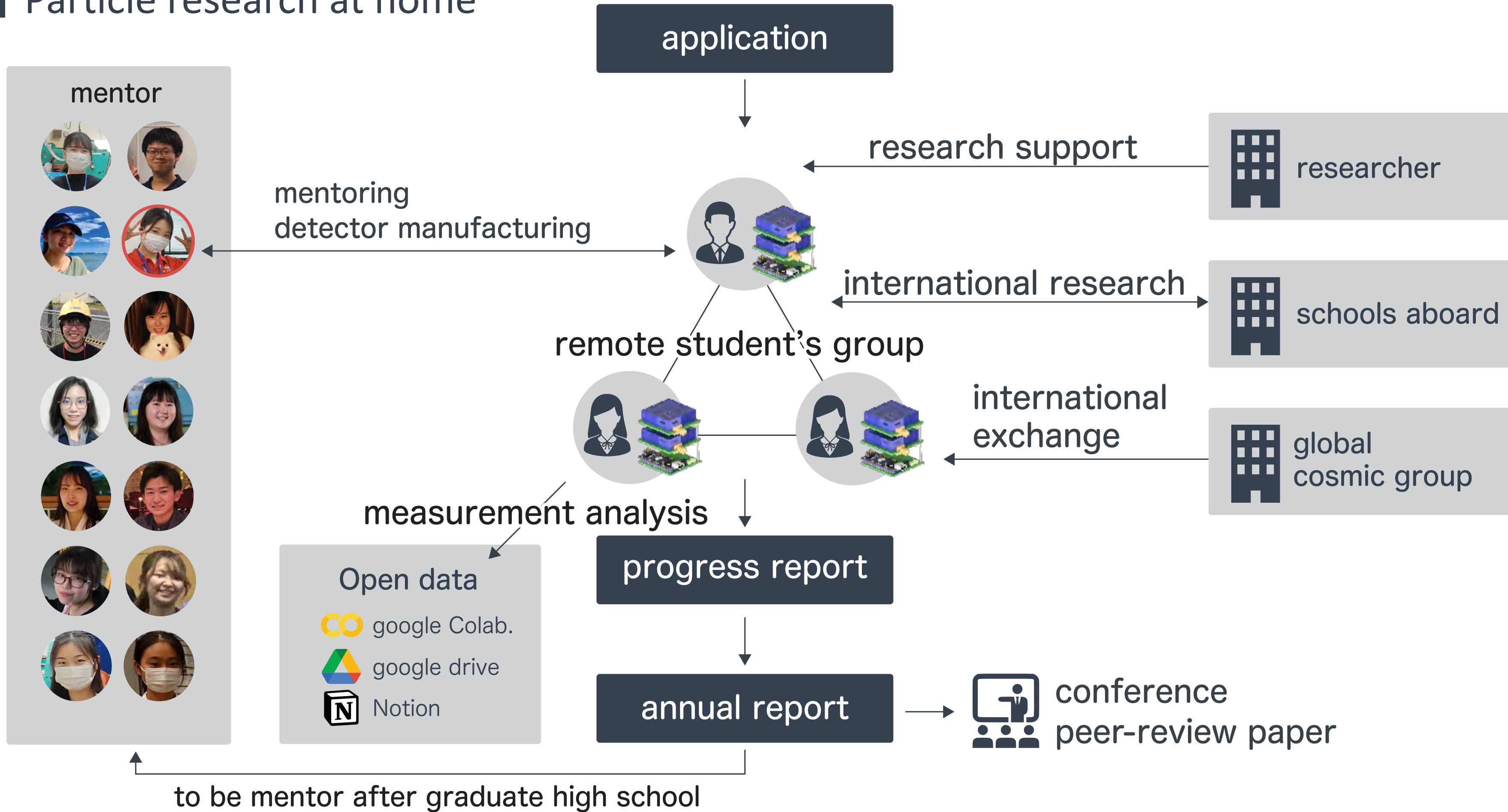


dual detector (under dev.)





# Particle research at home



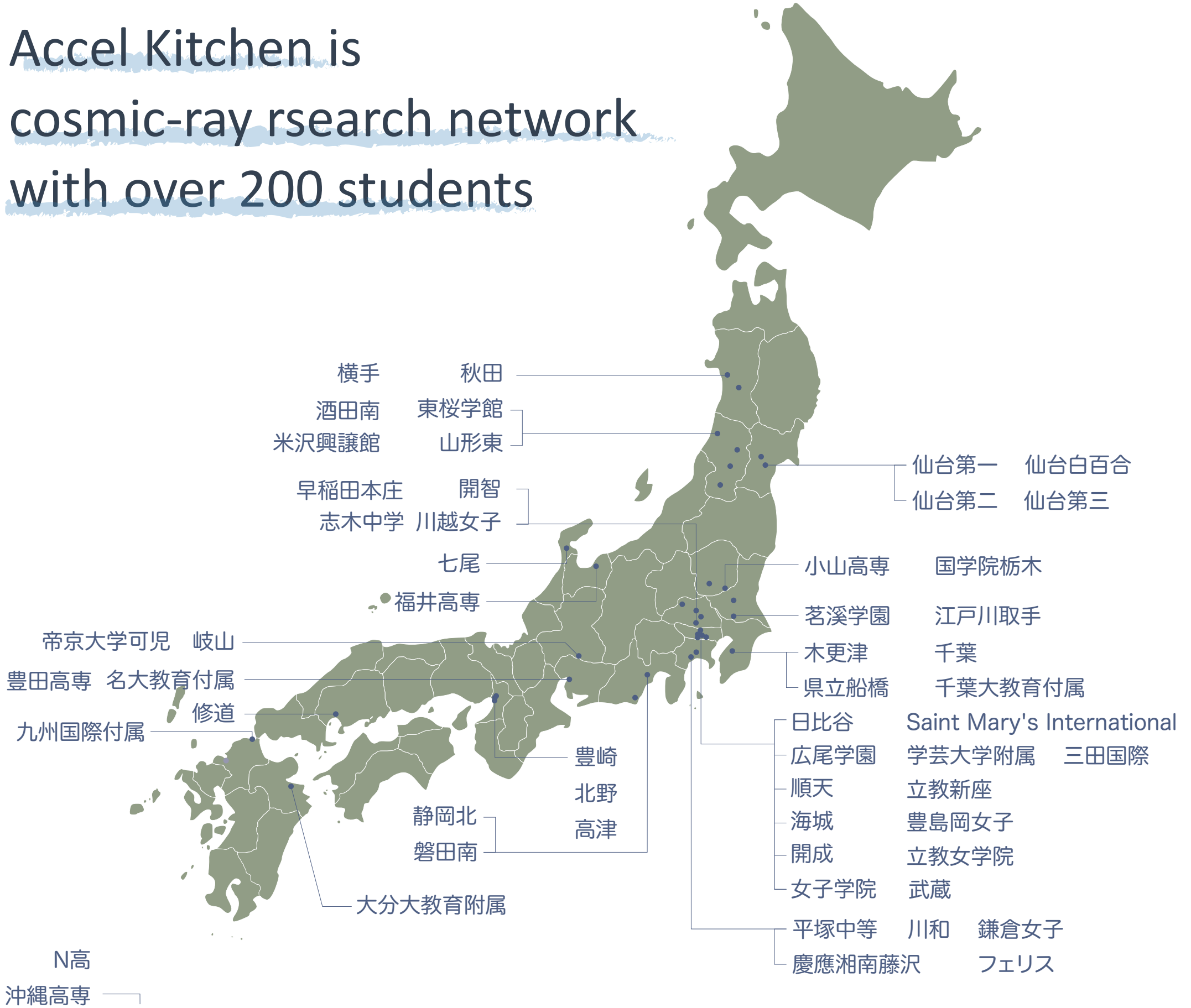
Accel Kitchen is  
cosmic-ray research network  
with over 200 students

Students's output

paper: 6 / year

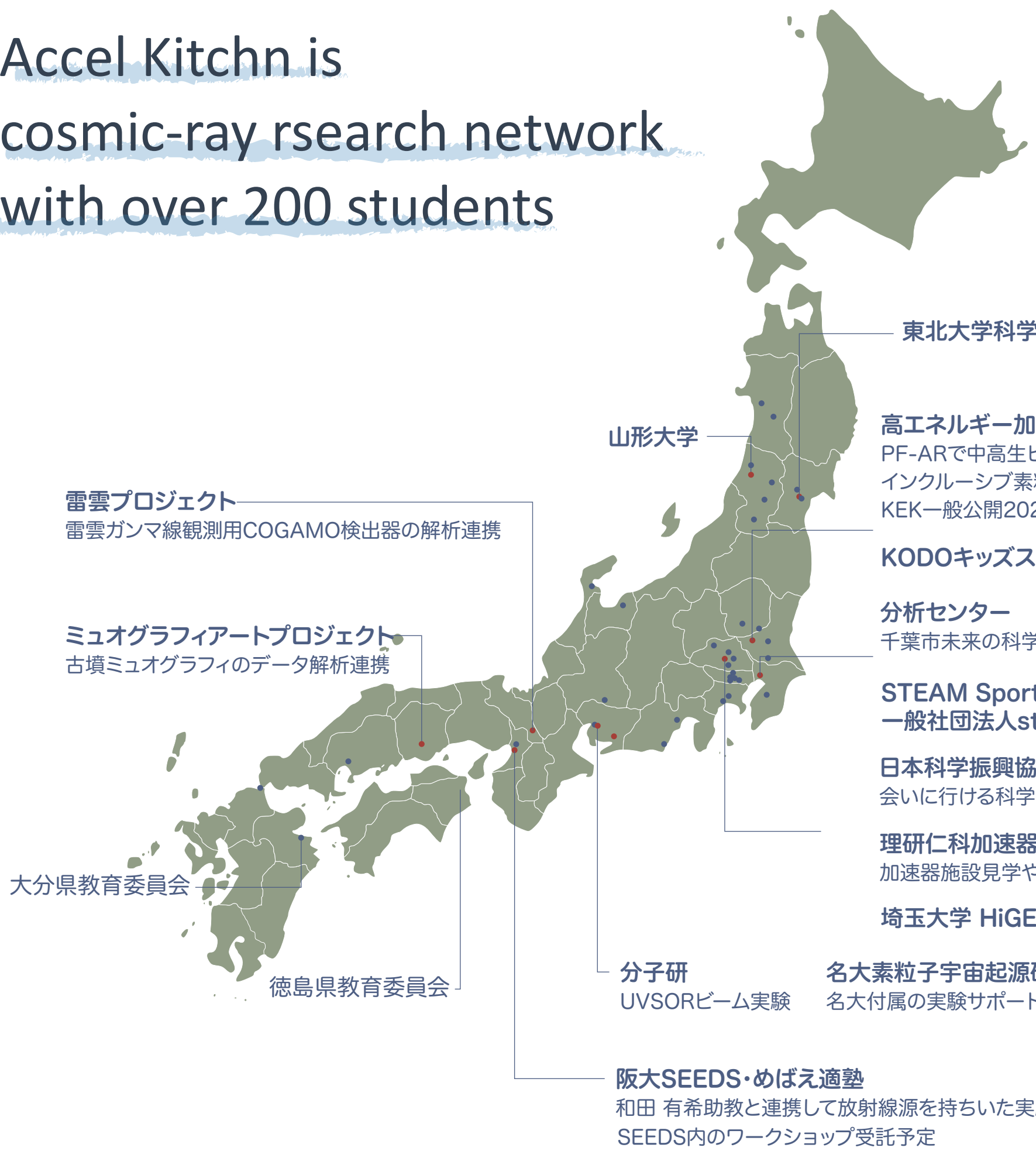
award: 6 / year

conference: 24 / year





# Accel Kitchn is cosmic-ray research network with over 200 students



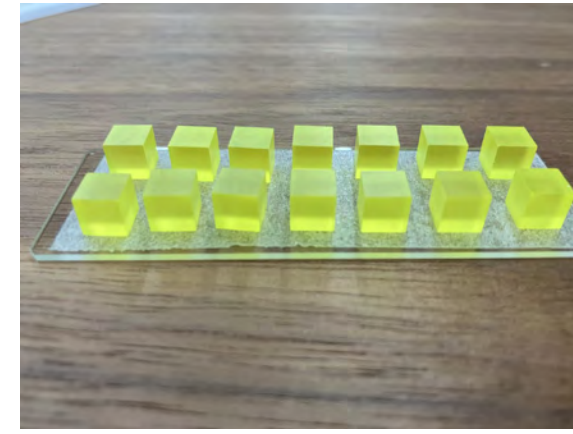
muography for ancient tomb



湯之奥金山地学実習



gamma-ray from thundercloud



C&A



Cho KEK



JAAS Science Festival



千葉市未来の科学者育成プログラム

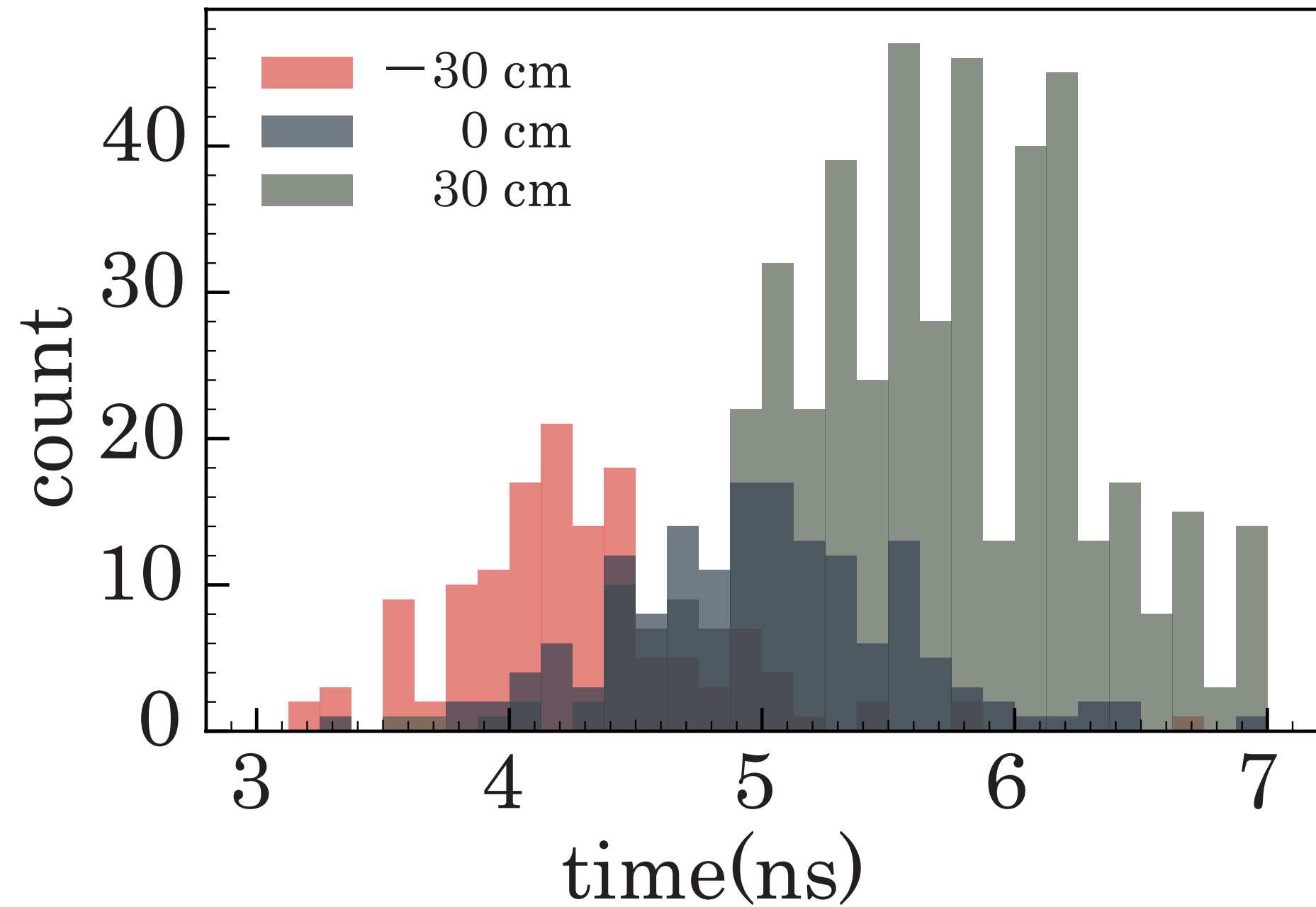
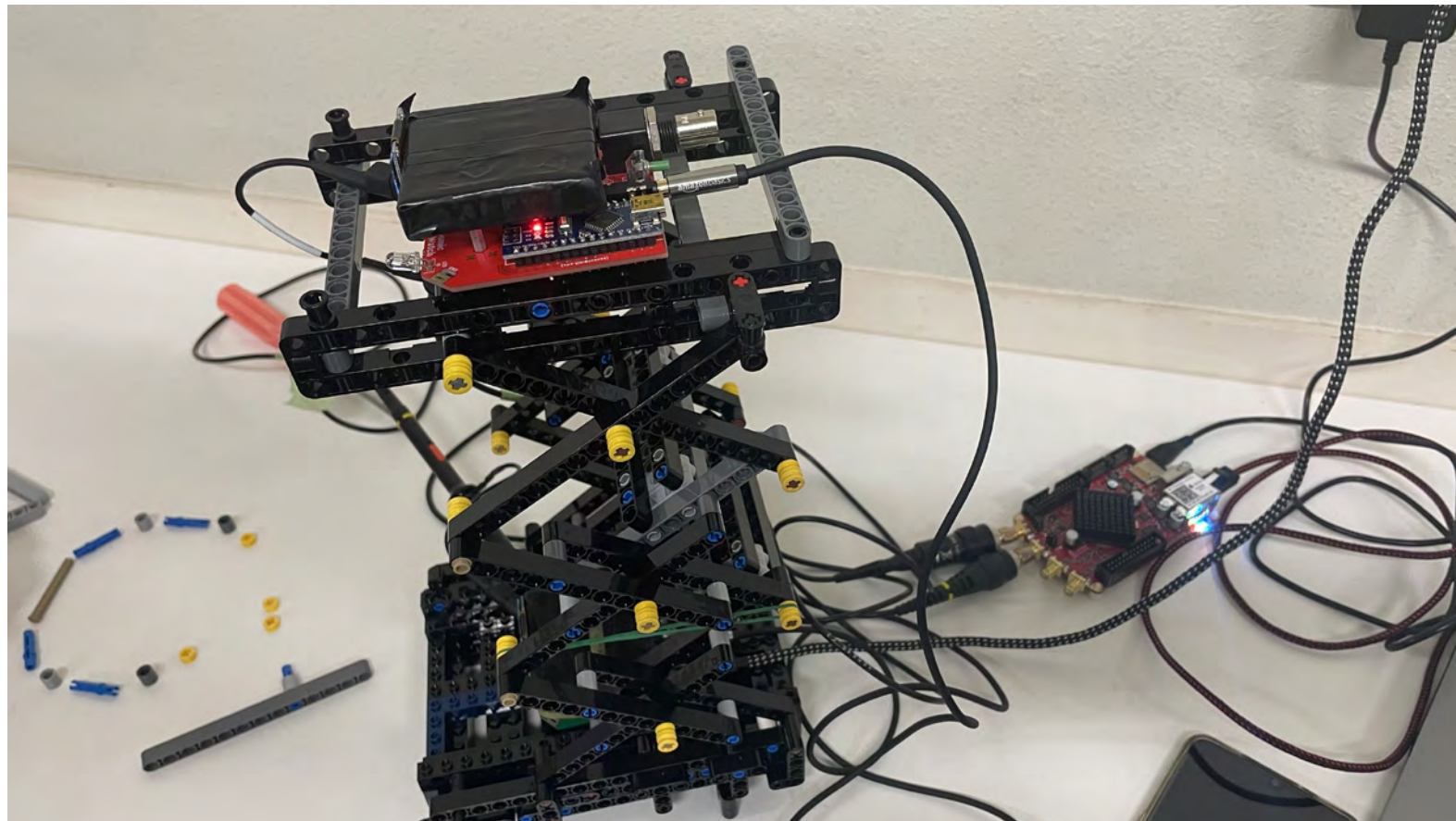


RIKEN RIBF



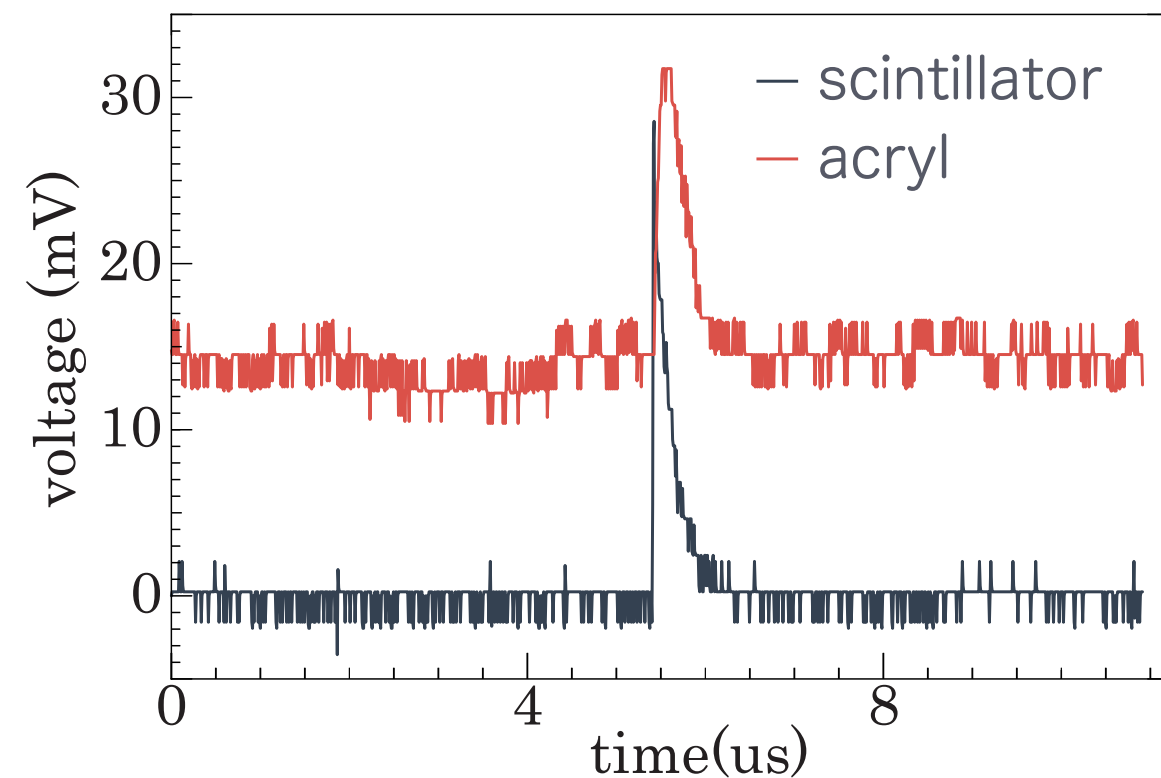
# detector developments by students

Time of Flight detector with sub-nano sec. DAQ

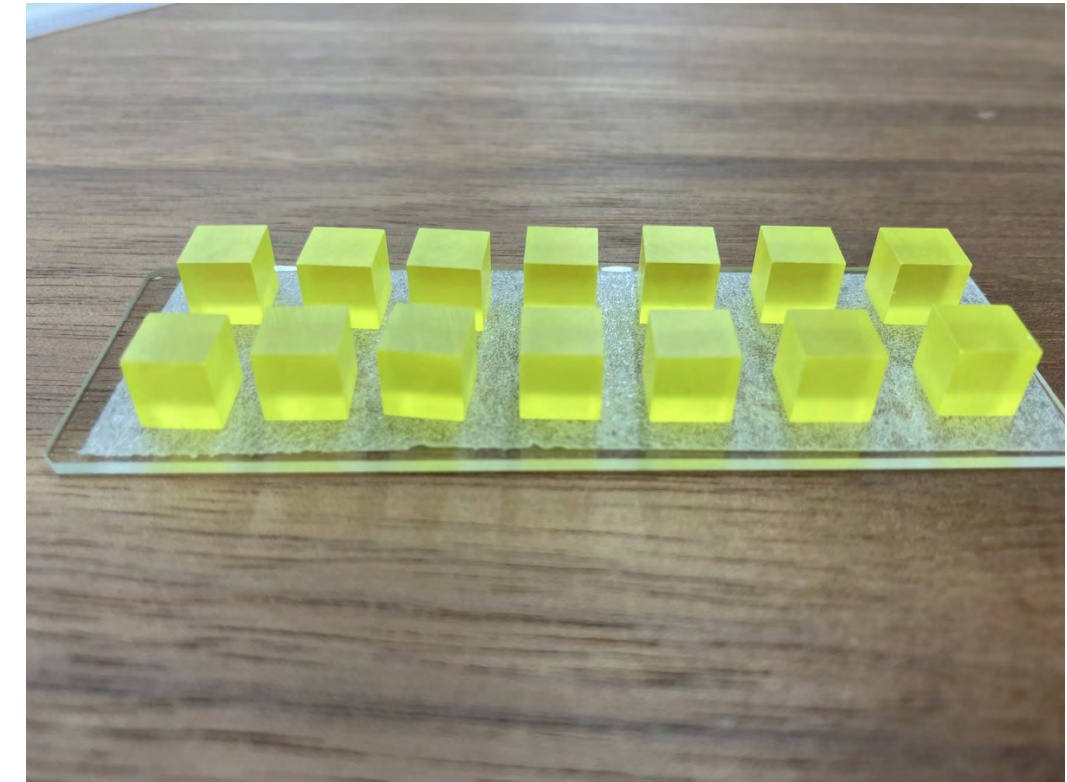


# detector developments by students

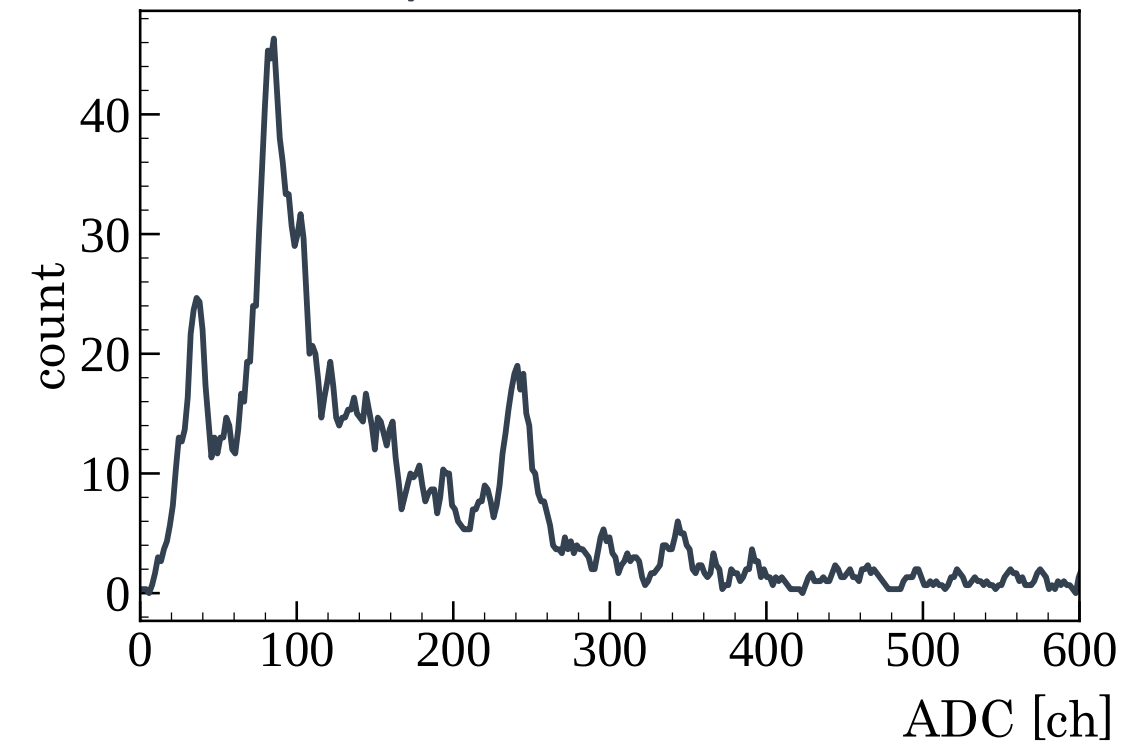
cherenkov detector with acryl block



substitute scintillator to other crystals



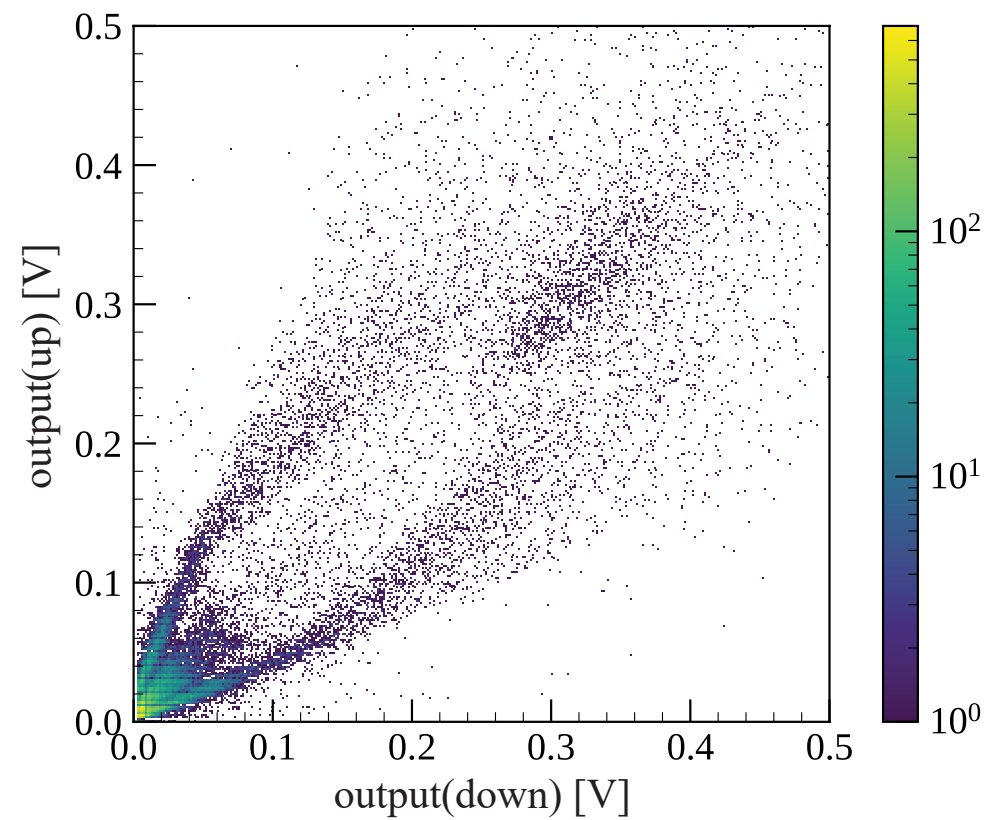
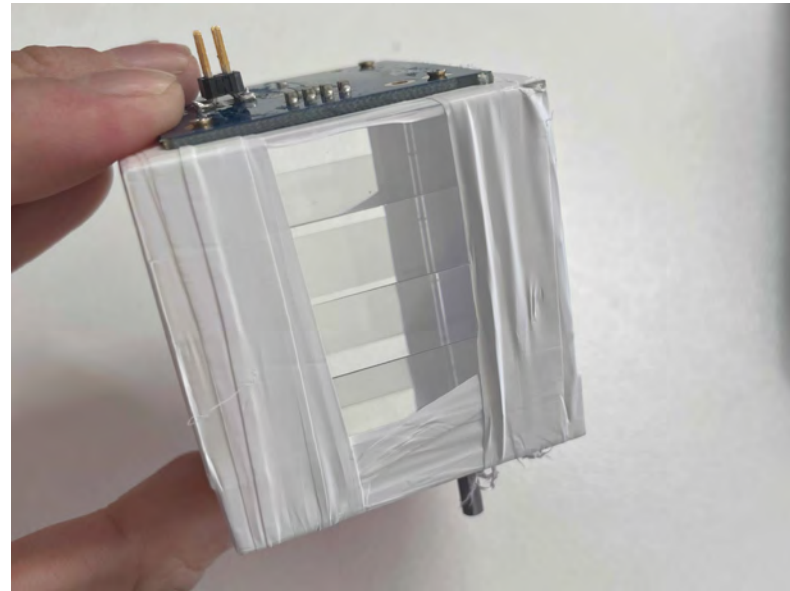
monazite spectrum with CsI scinti.



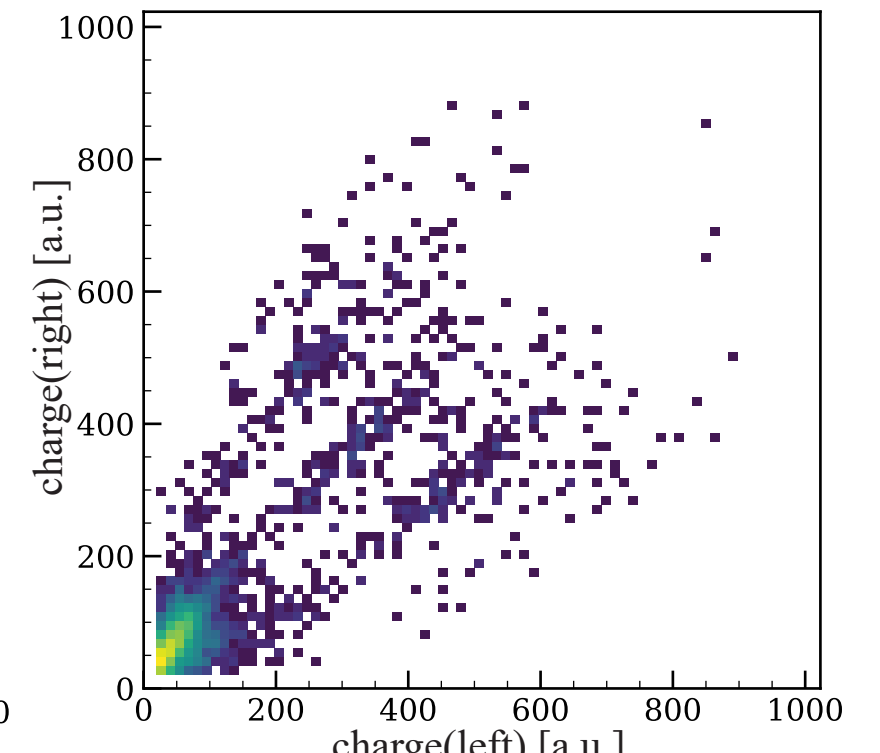
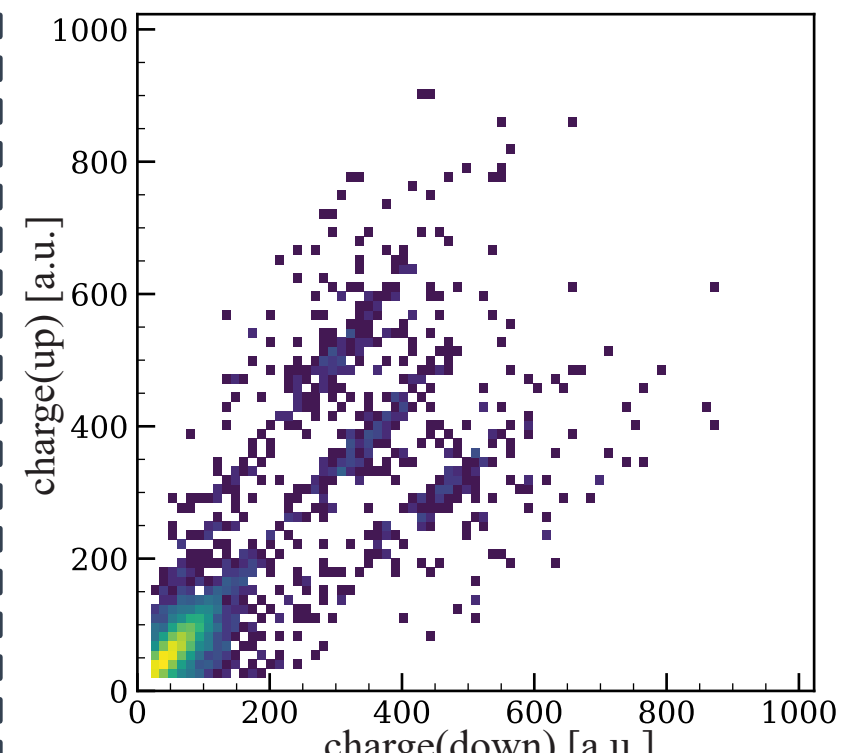
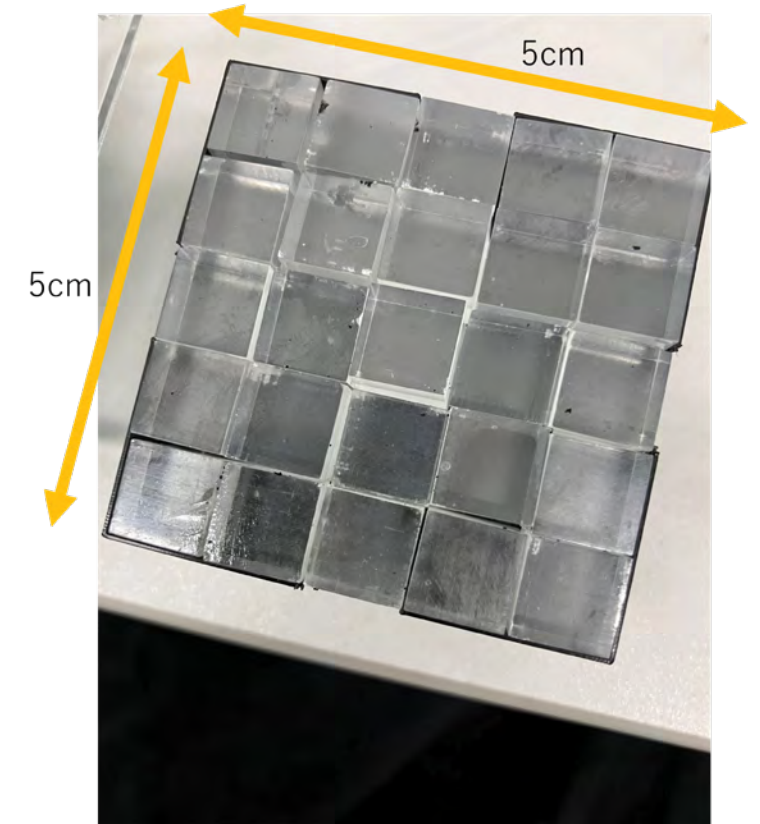


# detector developments by students

## 1-dimensional segment detector



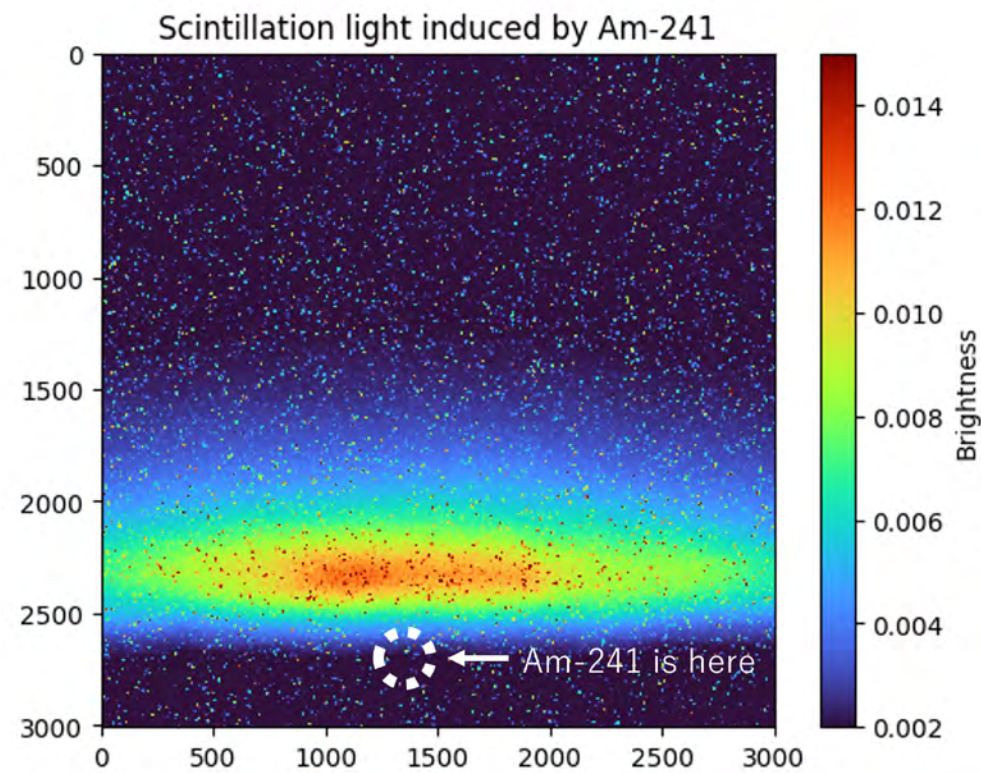
## 2-dimensional segment detector



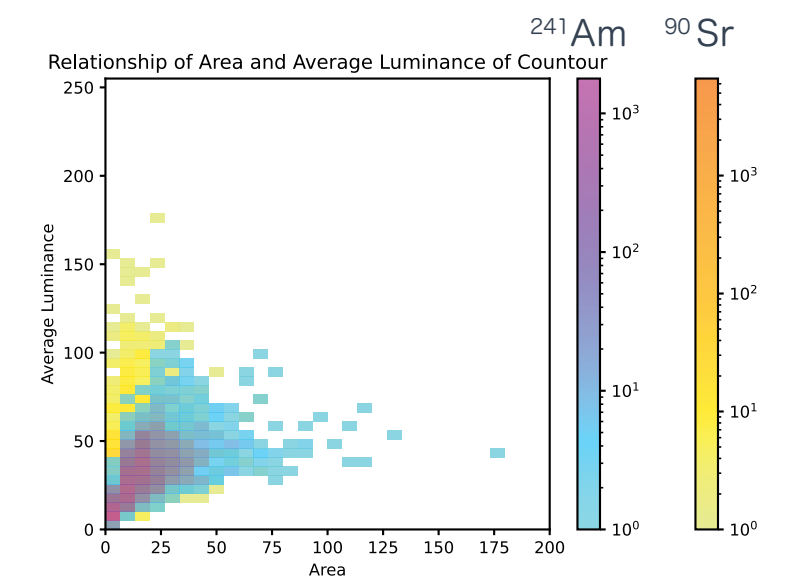
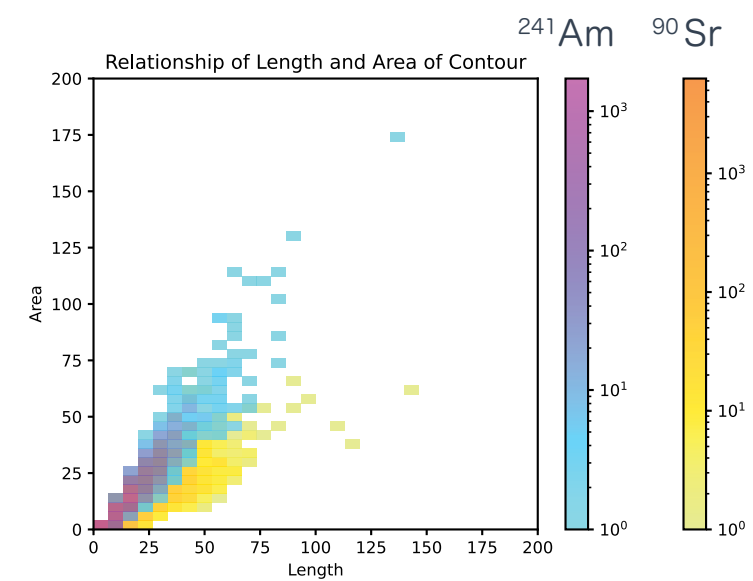
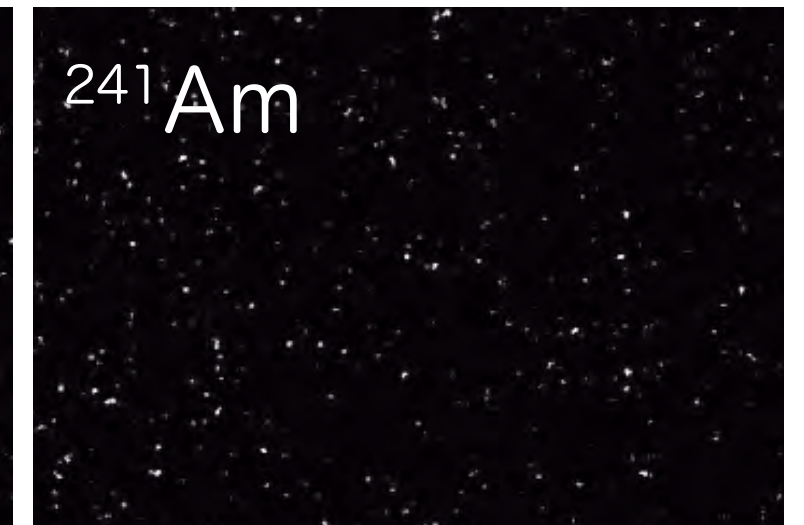
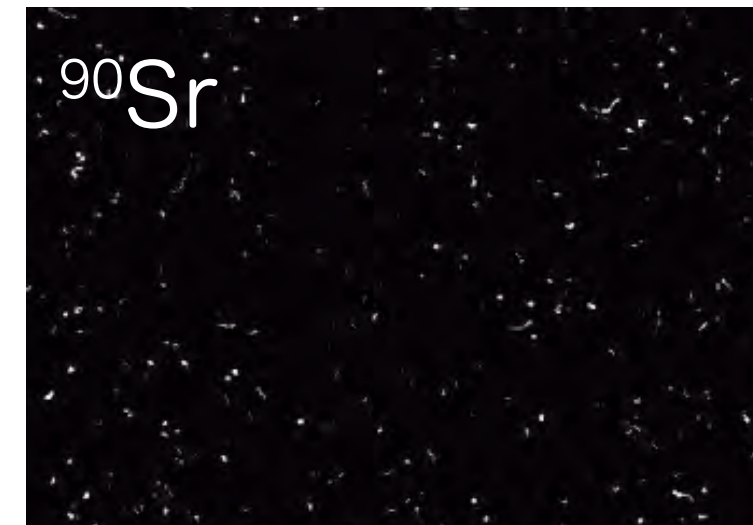
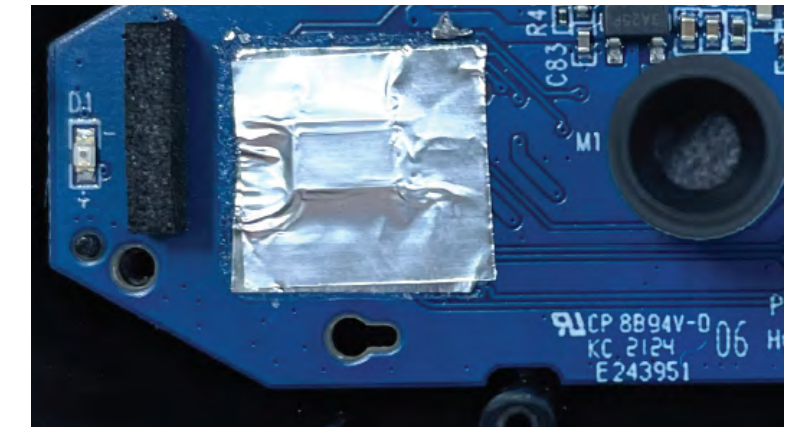


# detector developments by students

## scintillation light imaging with camera



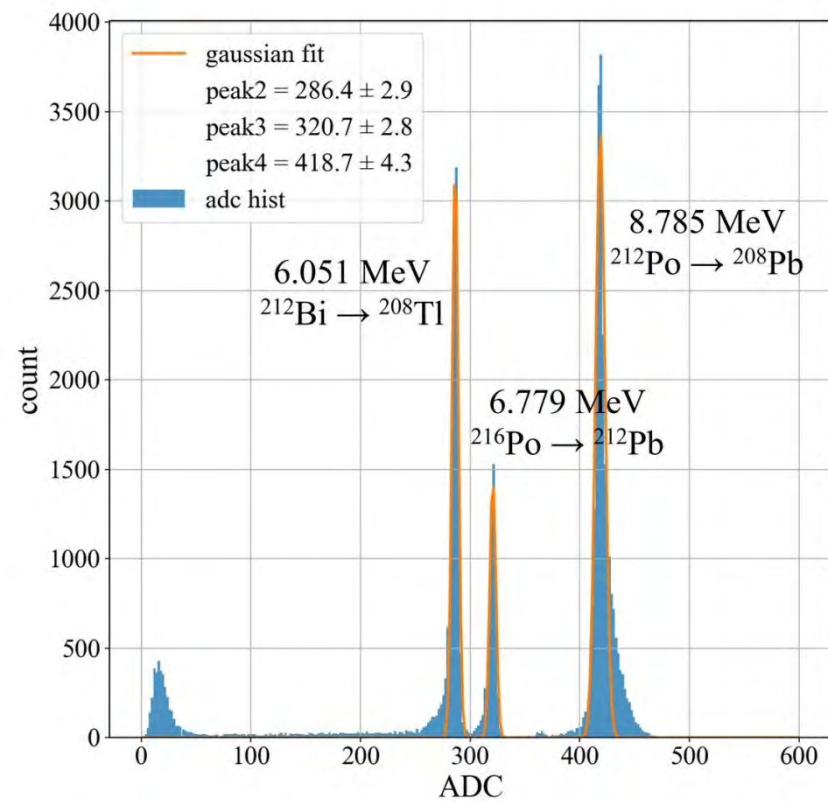
## Webcam detector



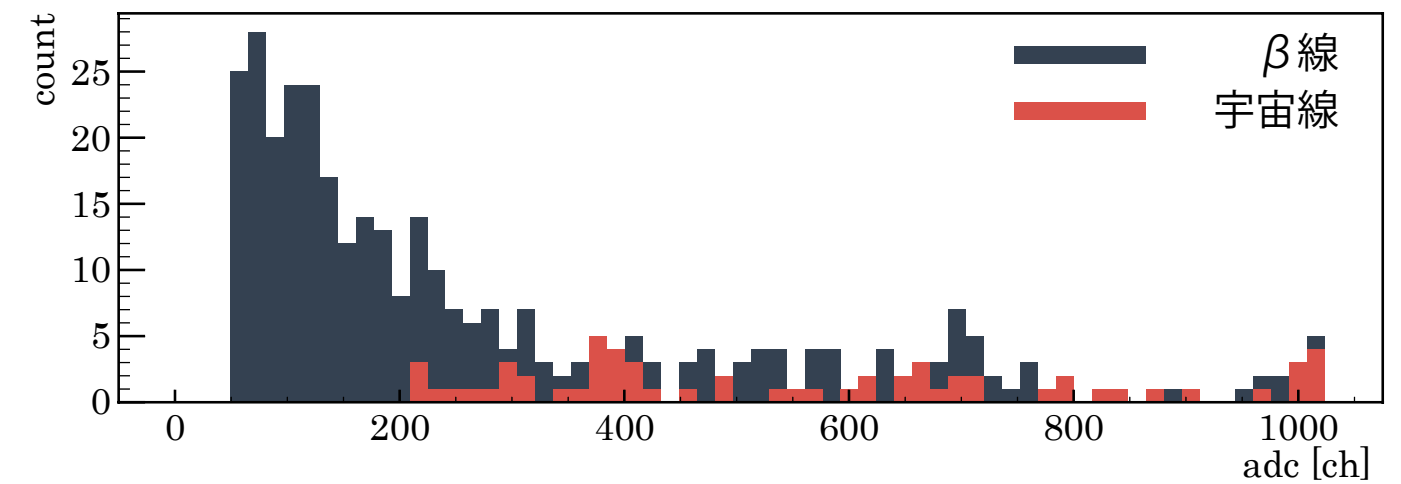
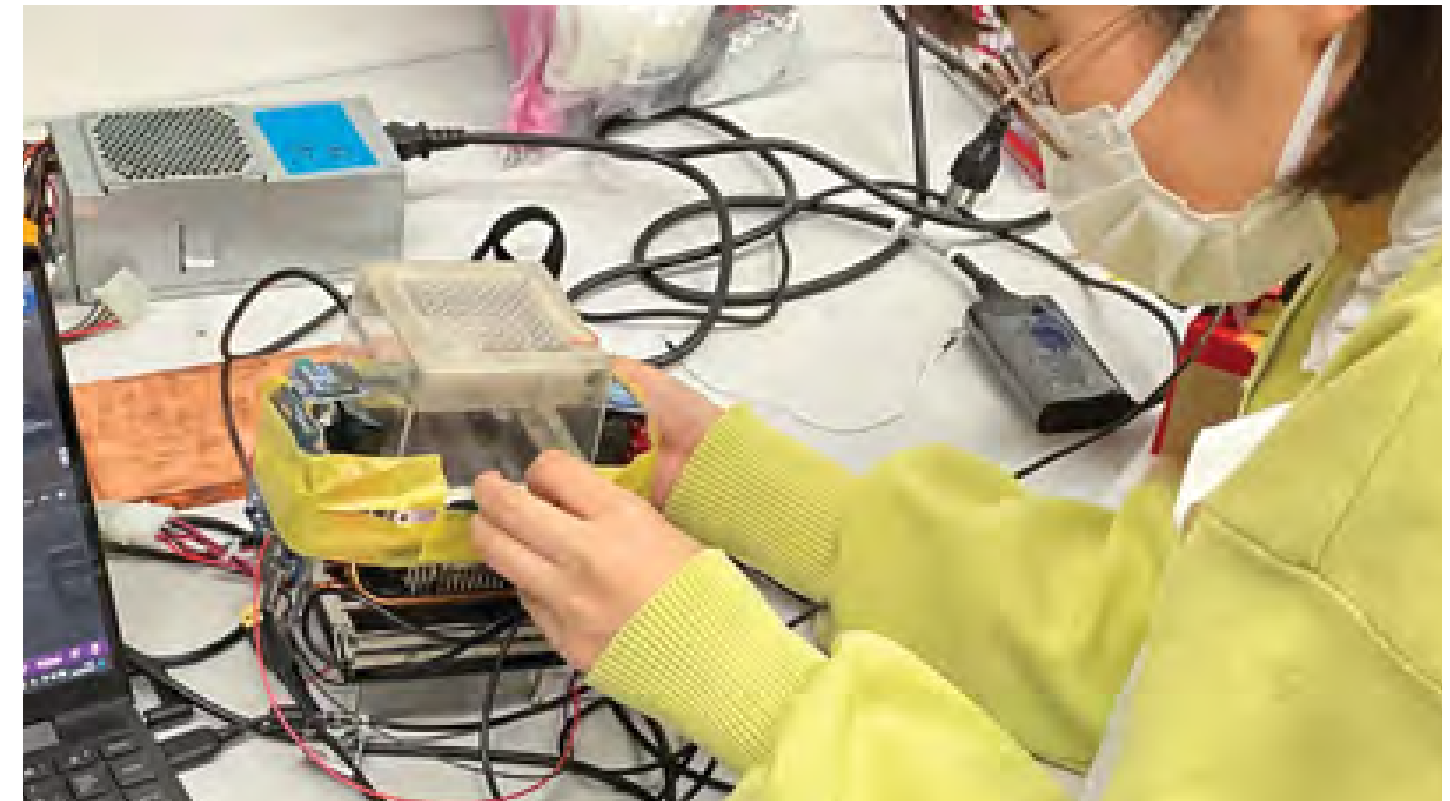


# detector developments by students

## radon detector

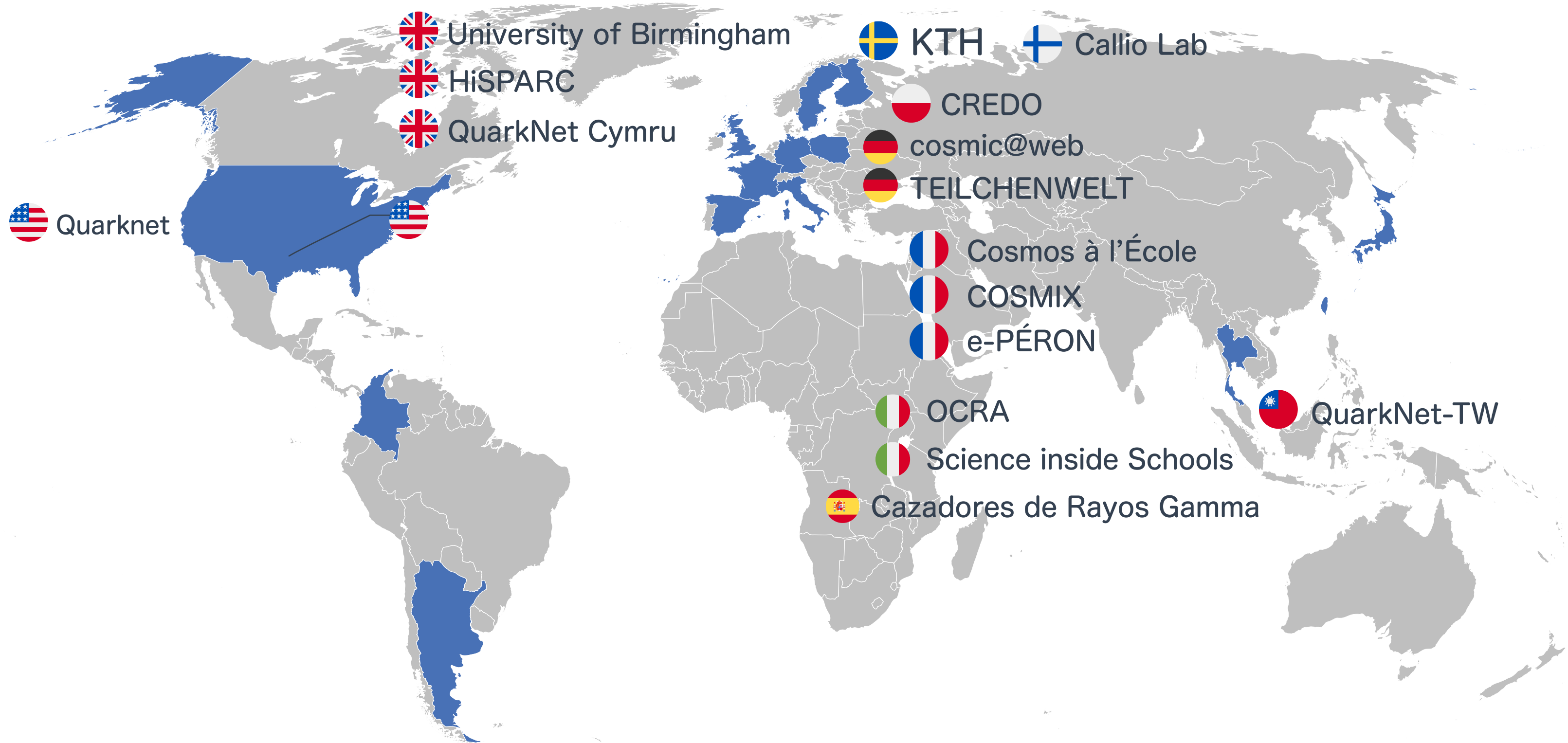


## cloud chamber sync detector



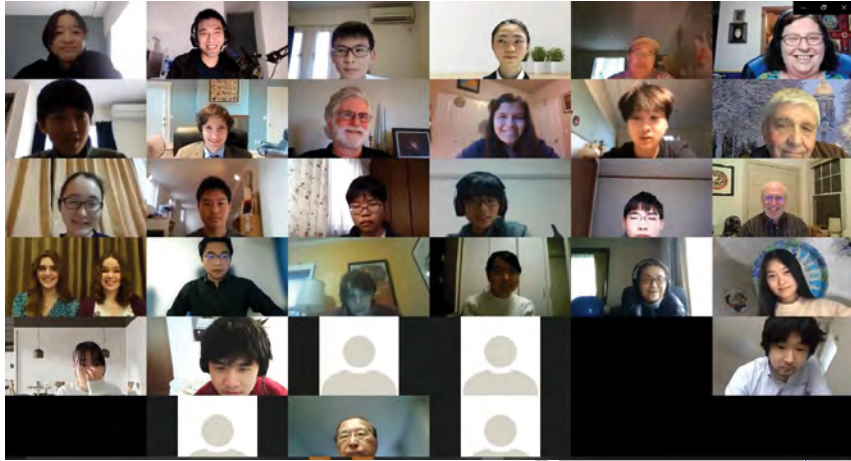


# Global Cosmic Group





# Global Cosmic Group



 University of Birmingham

 HiSPARC

 QuarkNet Cymru

 KTH  Callio Lab

 CREDO

 cosmic@web

 TEILCHENWELT

 Quarknet

 Langmuir Laboratory

- provided detectors
- thunder-cloud project
- (2024 July~)

 Cosmos à l'École

 COSMIX

 e-PÉRON

 Chiang Mai University

- provided detectors
- visited Japan

 QuarkNet-TW

 OCRA

 Science inside Schools

 Cazadores de Rayos Gamma

University of Antioquia

- provided detectors

 Huechulafquen Science Club

- provided detectors
- collaboration group with Japan
- BL4S collaboraetion
- visited Japan



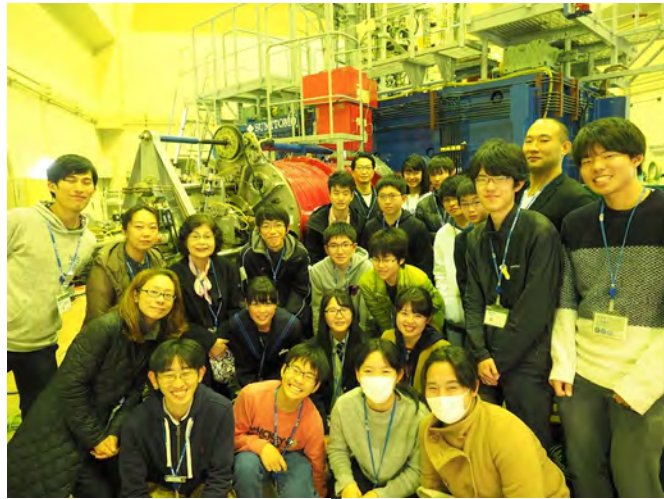


# nuclear fusion

# student's proposal

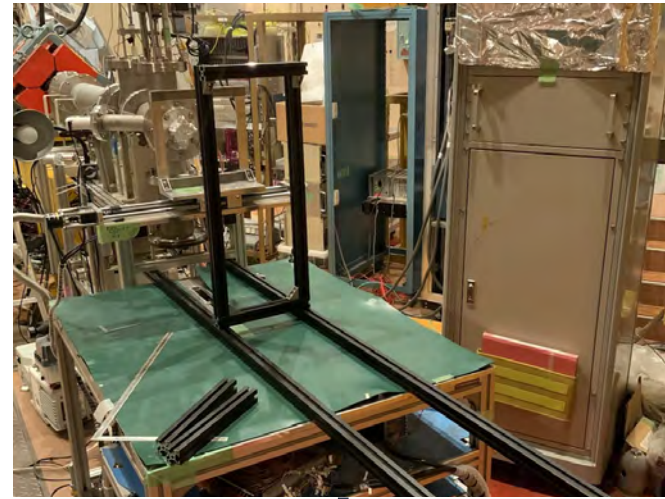
## 加速キッチン 🔍

～サイクロ流 地球にない原子～



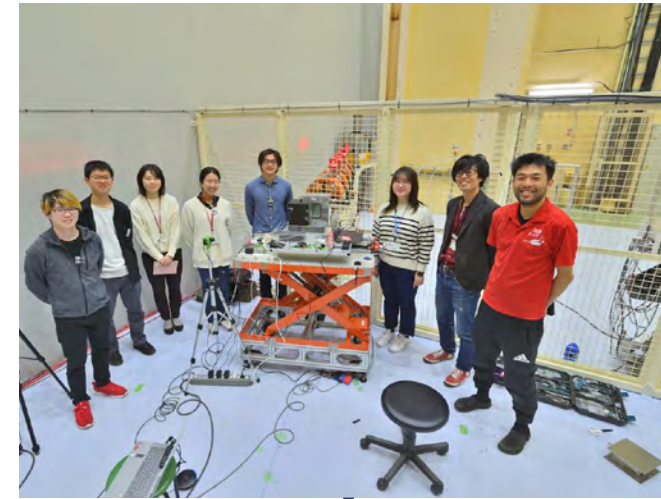
2019

## RARIS proton ToF



2021

## KEK PF-AR student's proposal



2024

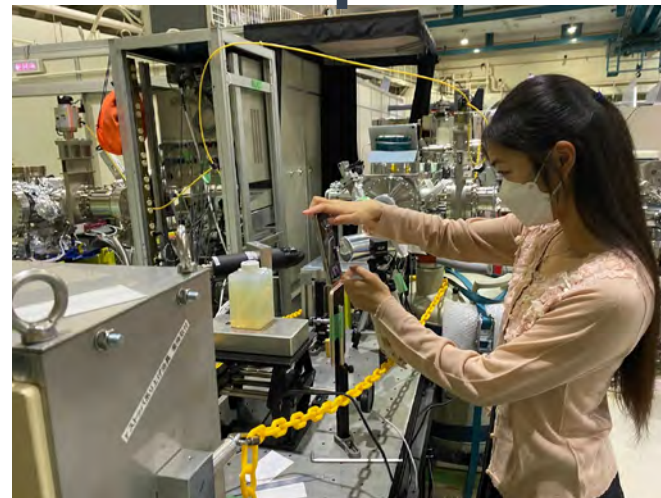
2018



## 加速キッチン 🔍

～サイクロ流 地球にない原子～

2020



## UVSOR gel dosimetry

2023



CERN beamline for Schools (2024. Sep)  
Tohoku University neutron line (TBA)  
Gumma University (TBA)



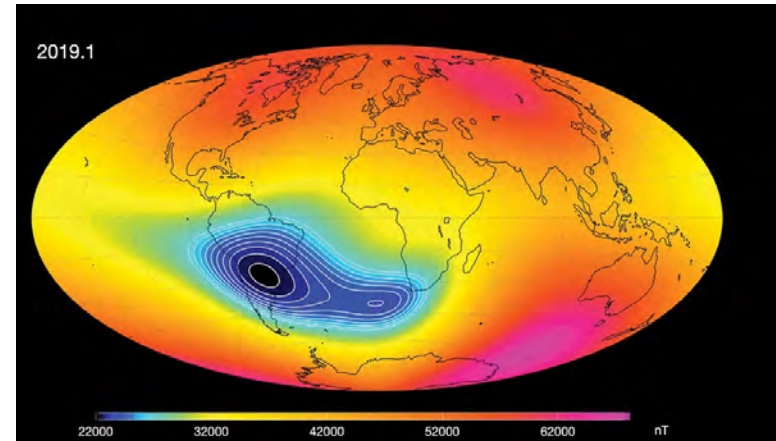
# Exchange student's idea and understanding of each group's activities.

## Examples

Cosmic measurement comparison with Argentina



exchange program in Japan



focusing to South Atlantic Anomaly

↳ We can provide this data!

gamma ray observation from thunder cloud at Langmuir Laboratory



Japanese detector for thunder cloud

↳ We can provide this detector!



best place for thunder at U.S.A

## Suggestions

### Cosmic Weather

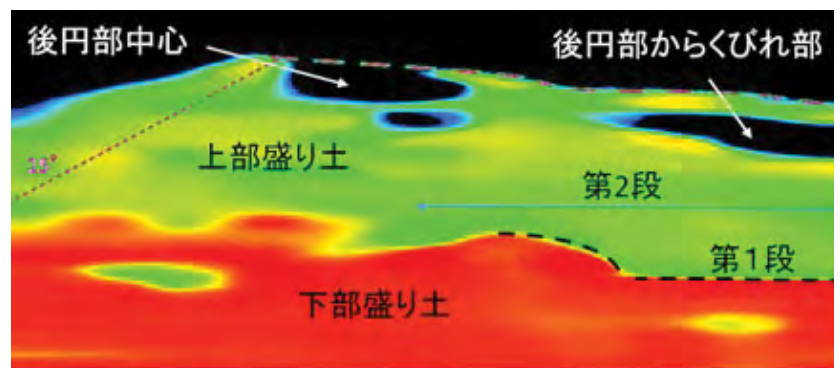
over 100 detectors are operating in Japan.  
Y. Ikemoto et al., *Journal of Science EGGS*, **7**, 2410001 (2024)  
↑ peer-review paper by the high school student.  
collaboration with SEVAN?

### Smartphone

SORAMAME in Japan (<https://soramame.n.kanagawa-u.ac.jp/>)  
collaboration with DECO, etc..

### Muography

ancient tomb muography in Japan



### cosmic-ray hiking

