

Nishina School 2023

Introduction of Program

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RNC/RIKEN

Nishina School 2023
RNC/RIKEN, July 27 – August 4, 2023

★Participant

- Peking University (5 students + 1 supervisor)
- Seoul National University (5 + 2)
- University of Hong Kong (5 + 1)
- Philips Exeter Academy (senior high school in USA, 3 + 1)
- Saitama University (2)
- Rikkyo University (3)

23 students in total

★ Objectives

Experimental nuclear physics

★ Program 2023

$^{12}\text{C}(p, \gamma)^{13}\text{N}$, $^{10}\text{B}(p, \alpha\gamma)^7\text{Be}$, $^{27}\text{Al}(p, p\gamma)^{26}\text{Al}$, $^9\text{Be}(p, \gamma)^{10}\text{B}$ reaction experiments
with training and lectures

Objectives (for staff scientists)

1. **Educational research using RIKEN's accelerators**
2. **Establishment of a basic course on nuclear physics**
3. Collaborative development of detectors and other experimental apparatus for educational research
4. Joint seminars
5. Other educational research and programs agreed to by both parties

Objectives

- ★ Introduction to **nuclear physics EXPERIMENTS**
on the site of the RI Beam Factory at RIKEN
- one of the world leading facilities in the field of nuclear physics
giving a flavor of research frontier
- ★ We **hope** you to enhance motivation toward nuclear research,
nuclear physics laboratories in your university

Program 2023

Focus: $^{12}\text{C}(\text{p}, \gamma)^{13}\text{N}$, $^{10}\text{B}(\text{p}, \alpha\gamma)^7\text{Be}$, $^{27}\text{Al}(\text{p}, \text{p}\gamma)(\text{p}, \alpha\gamma)$, $^9\text{Be}(\text{p}, \gamma)$
reaction experiments with training and lectures

with proton beams

A typical nuclear reaction – “beam and target”

Nuclear resonant states

Nuclear astrophysics and/or nucleosynthesis

<1st week>

July 27: opening, introductions, network security, 2 lectures

July 28: RIBF Tours, 2 lectures, 2 training programs

<2nd week>

July 31: 2 lectures, group works for experiment (6 groups)

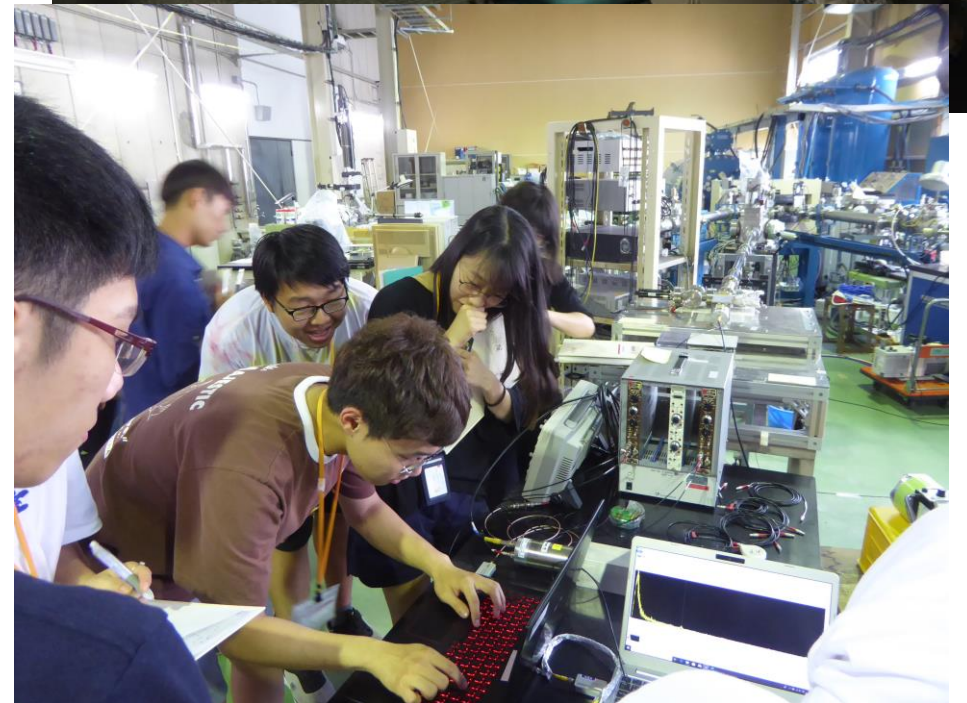
Aug. 1: visiting to pelletron, group works for experiment

Aug. 2: reaction measurements with proton beams

Aug. 3: auxiliary measurements, data analysis, preparation for presentation

Aug. 4: presentation by each group, summary, Farewell party

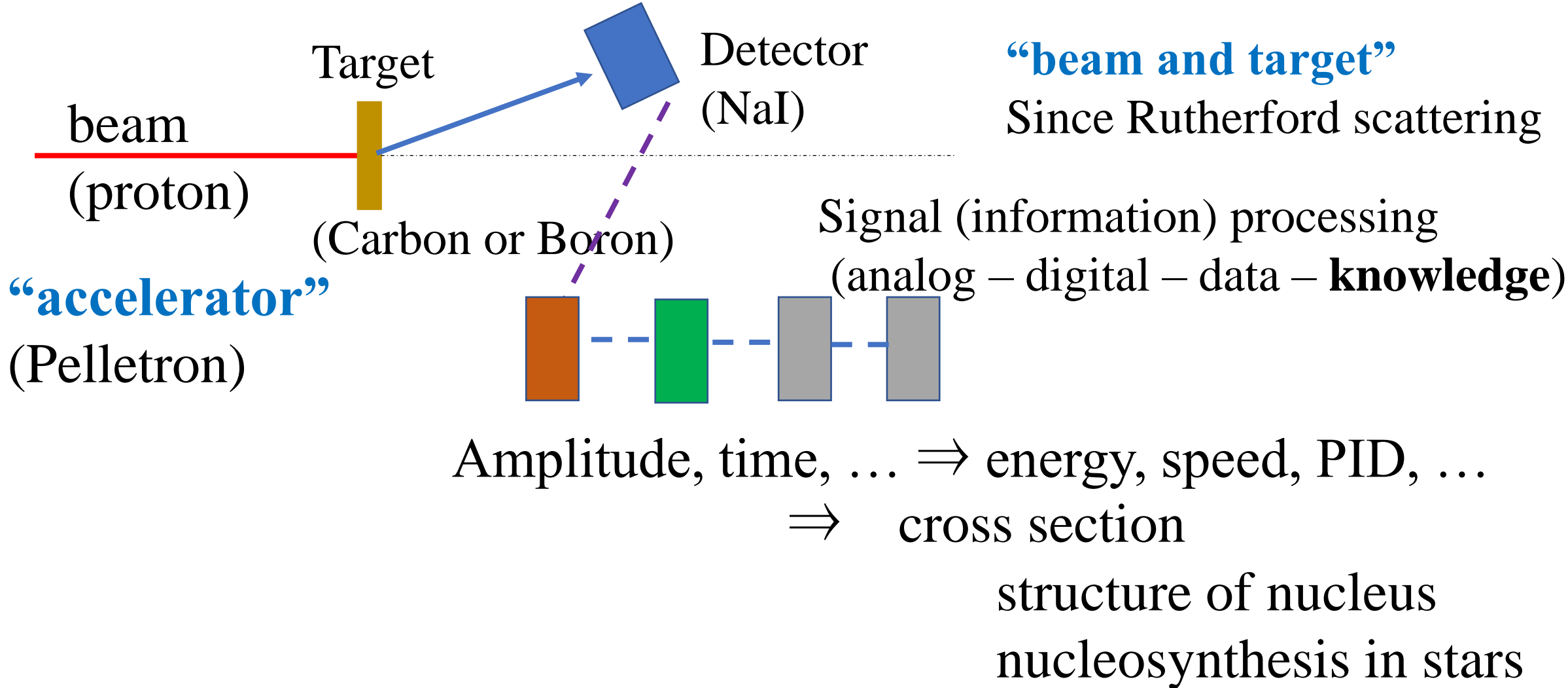
Nishina School 2019

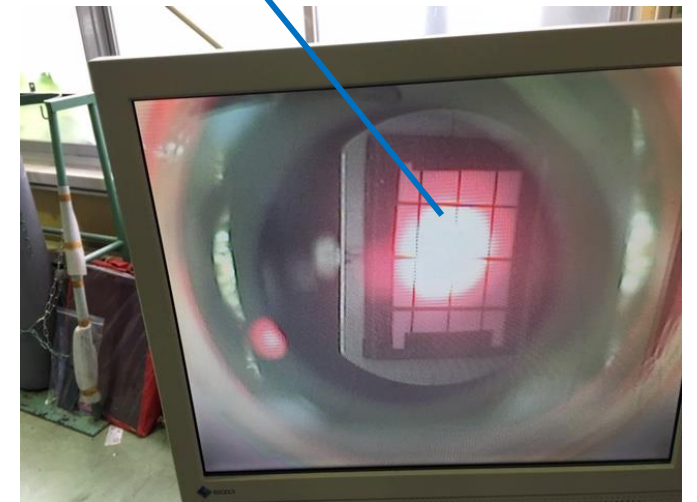
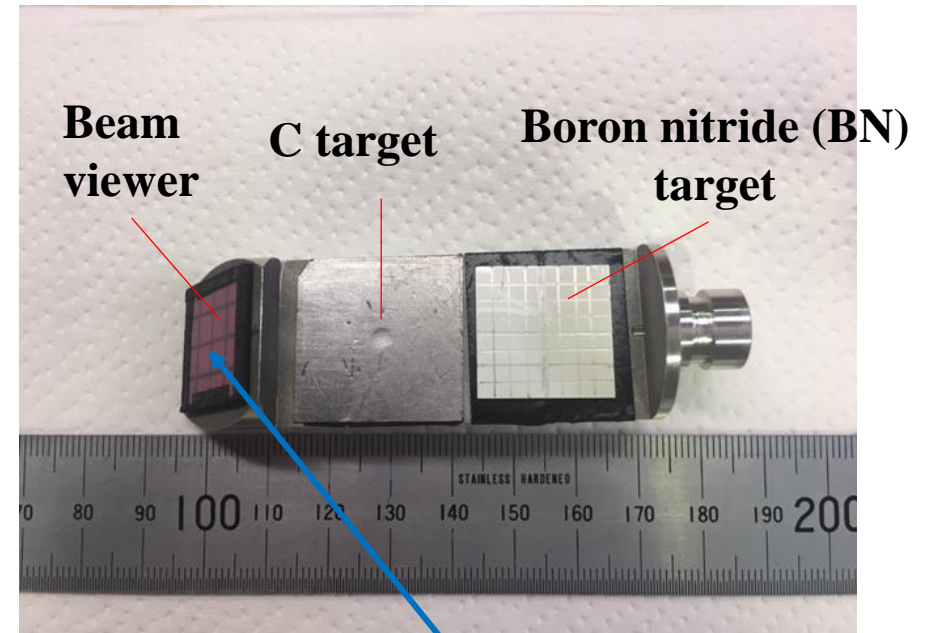
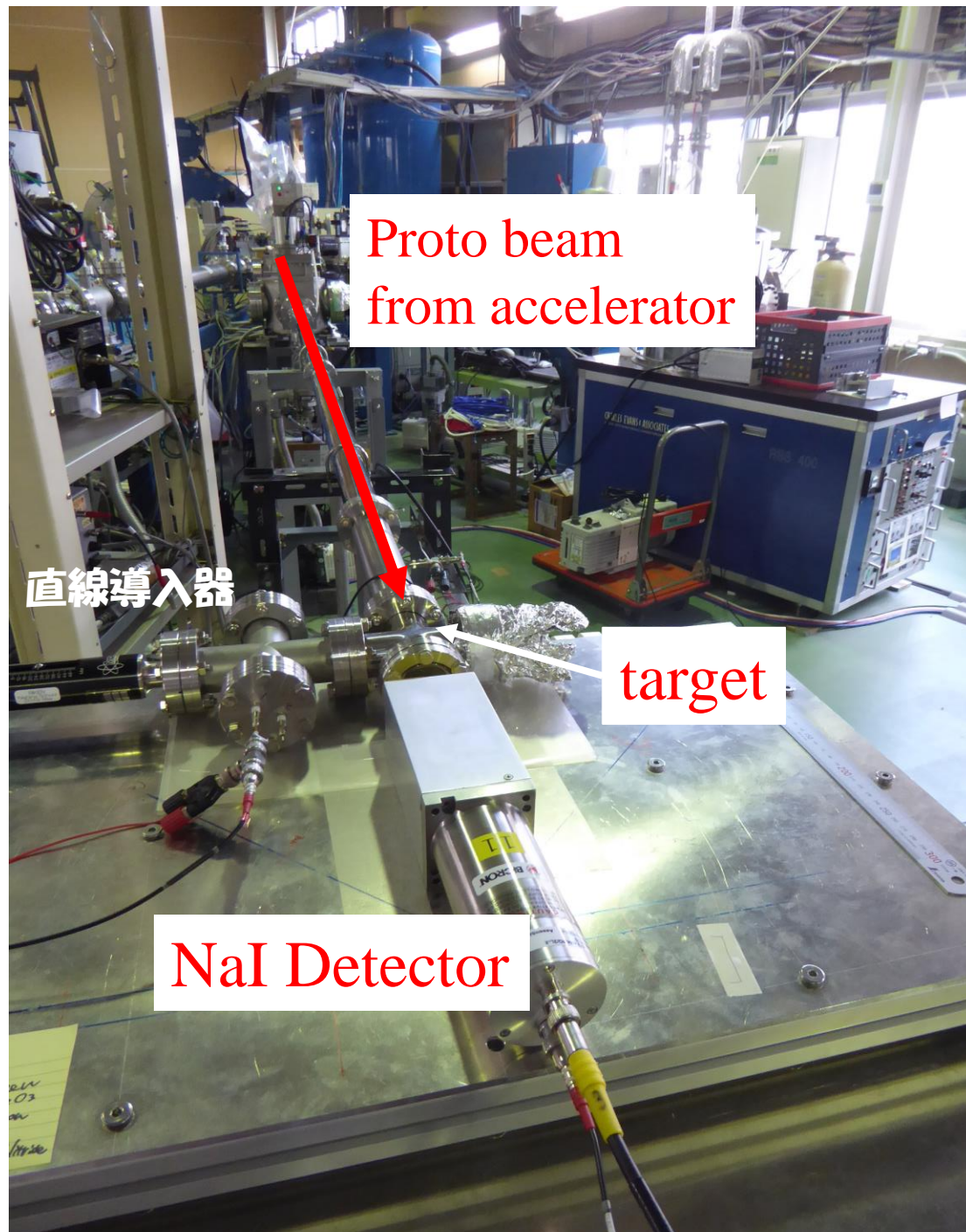




A typical scheme of reaction experiments

Nuclear reaction study with energetic beams





6 groups for experiment

$^{12}\text{C}(p, \gamma)^{13}\text{N}$ exp. (in-beam), $E_p = 2 \text{ MeV}$

$^{12}\text{C}(p, \gamma)^{13}\text{N}$ exp. (activation), $E_p = 2 \text{ MeV}$

$^{10}\text{B}(p, \alpha\gamma)^7\text{Be}$ exp. (in-beam), $E_p = 2 \text{ MeV}$

$^{10}\text{B}(p, \alpha\gamma)^7\text{Be}$ exp. (activation), $E_p = 2 \text{ MeV}$

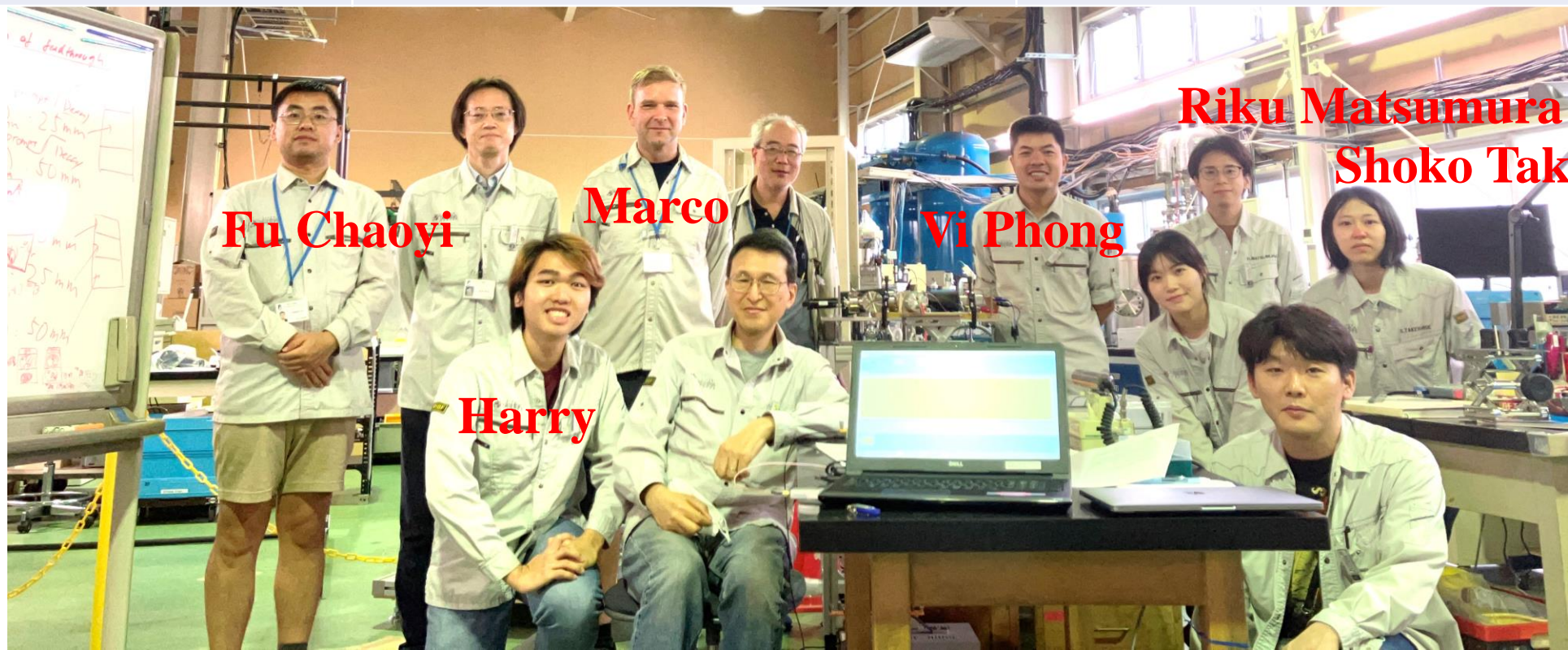
$^{27}\text{Al}(p, p\gamma)\&(p, \alpha\gamma)$ exp. (in-beam), $E_p = 2 \text{ MeV}$

$^9\text{Be}(p, \gamma)^{10}\text{B}$ exp. (in-beam), $E_p = 2 \text{ MeV}$

University	Name	Group #	Year	Reaction
Peking University	Yan Zhou	1	4th	10B in-beam
Seoul National University	Song Seokhyeon	1	4th	
University of Hong Kong	Yang Yuting	1	3rd	
Phillips Exeter Academy	Daria Ivanova	1	High School	
Peking University	Chen Jiawei	2	4th	10B Activation
University of Hong Kong	Ng Cheuk Yan	2	3rd	
Phillips Exeter Academy	Cee McClave	2	High School	
Rikkyo U	Hiroya Tamaru	2	4th	
Peking University	Gao Leyun	3	4th	27A1
Seoul National University	Hwang Junsang	3	3rd	
Phillips Exeter Academy	Ishaan Vohra	3	High School	
Saitama U	Yuta Kikuchi	3	4th	

Peking University	Bian Jiawei	4	4th	9Be
Seoul National University	Kwon JunHwan	4	3rd	
University of Hong Kong	Kim DaHyung	4	3rd	
Rikkyo U	Hiroto Matsubara	4	4th	
Peking University	Du Zeyu	5	4th	12C In-beam
Seoul National University	Kim Seongmin	5	3rd	
University of Hong Kong	Lam Pak-Chung	5	2nd	
Rikkyo U	Kota Abe	5	4th	
Seoul National University	Jung Seungwon	6	4th	12C Activation
University of Hong Kong	Chen Zhihui	6	1st	
Saitama U	Kazuki Takiura	6	M1	

target	In-beam	Activation
^{12}C	Shoko Takeshige	Vi Phong
^{10}B	Marco	Fu Chaoyi
^{27}Al	Harry	-----
^9Be	Riku Matsumura	-----



Fu Chaoyi

Marco

Vi Phong

Harry

Riku Matsumura

Shoko Takeshige

Some notes

Be careful:

high-voltage, radiation, ... Follow the instructions.

in general, we less protected than in our daily life
from damages...

forbidden – use of “ peer to peer” (P2P) file sharing software

Note taking

#log-note for each group

Discussion in the team

Network connection : through “guest” with pass wd: rikenwlanguest

Our web page: <https://indico2.riken.jp/event/4531/>