Nishina School 2019   summary

Tohru Motobayashi

Peking University   Rikkyo University
Seoul National University   Tohoku University
Hong Kong University
Phillips Exeter Academy

History

Peking Univ. since 2008 / Seoul Nat. Univ. 2012 / Hong Kong Univ. 2016

Objectives

Experimental nuclear physics
planning, feasibility study, preparation, experiment, analysis, report

Program 2019

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

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
  or, more in general, physics,
    and possibly nuclear physics laboratories in your university

focus: $^{12}C(p,\gamma)^{13}N$ and $^{10}B(p,\alpha)^7Be^*$ reactions

- a typical nuclear reaction – "beam and target paradigm"
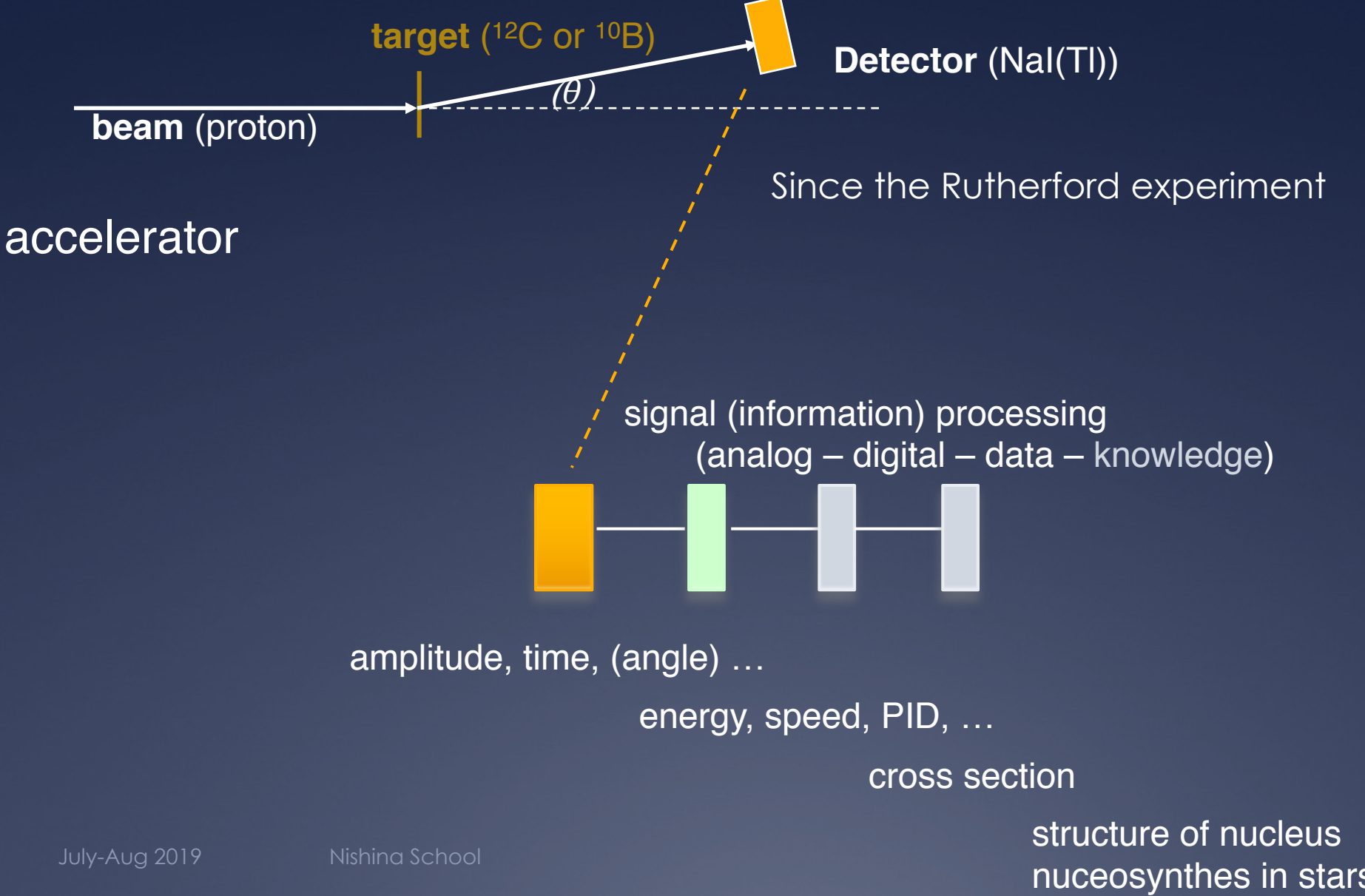- nuclear resonant states
- nuclear astrophysics or nucleosynthesis
- "cutting edge" research in 1970's.

measurements of γ rays

- promptly emitted or from reaction products

nuclear reaction study with energetic beams

target (^{12}C or ^{10}B)

Detector (NaI(Tl))

(θ)

beam (proton)

accelerator

Since the Rutherford experiment

signal (information) processing
(analog – digital – data – knowledge)

amplitude, time, (angle) …

energy, speed, PID, …

cross section

structure of nucleus
nuceosynthes in stars

Program 2019

<1st week>

July 30: opening, introductions, network security, 1 lecture

July 31: RIBF Tours, 2 lectures, 2 training programs, **party**

Aug. 1: 1 lecture, 1 training program, group works for experiment (6 groups)

Aug. 2: 1 lecture, group works for experiment

<2nd week>

Aug. 5: preparation for experiment

Aug. 6: reaction measurements with proton beams

Aug. 7: auxiliary measurements, data analysis, preparation for presentation

Aug. 8: No specific program (analysis, preparation for presentation, free time)

Aug. 9: presentation by each group, summary, **Farewell party**

The ^{12}C(p,γ)^{13}N and ^{10}B(p,α)^{7}Be* experiments

two methods: "in-beam" and "activation"
    at 1MeV and 2MeV with a C target (for ^{12}C)
    at 2MeV with a BN target (for ^{10}B)

results

    cross sections?
    additional γ lines?
    other unexpected observations?

the word "theory"!   and "error"

some tips and notes

    aluminum or aluminium?   ar-u-mi-ni-u-mu (Japanese)
    Na: natrium or sodium?   na-to-ri-u-mu
        NaI: "sodium iodide"   enu-ei-ai
    errors (propagation, ….)
    averaged cross section

Some notes

Be careful:

    high-voltage, radiation … Follow the instructions.
    in general, we are less protected (than in our daily life)
       from damages ….
    forbidden – use of "pier to pier"(P2P) file sharing software
       see the document

Log note

    diary ("chronological"), one note for one project (team)
    date and time, do not use pencil or erasable pen,

Discussions in the team

The web page
https://indico2.riken.jp/event/3068
Do not link from other webpages *etc*.

Some notes

Be careful:

    high-voltage, radiation … Follow the instructions.
    in general, we are less protected (than in our daily life)
        from damages ….
    forbidden – use of "pier to peer (P2P) file sharing software"
        see the document

Log note

    diary ("chronological"), one note for each subject (team)
    date and time, do not use pencil or erasable pen,

Discussions in the team

The web page
https://indico2.riken.jp/5068
\# Do not link from other webpages *etc*.

No accident!

Lively and thoughtful discussions

Students and Supervisors (1)

Peking University

GUO, Chengyu	Student (4th)
HU, Ziyao	Student (4th)
WANG, Hao	Student (4th)
YANG, Lisheng	Student (4th)
ZHOU, Zhenxiang	Student (4th)
WU, Jing	University Staff

Seoul National University

WOO, Seungbum	Student (3rd)
KUM, Minju	Student (3rd)
LEE, Joo Hyun	Student (3rd)
KWON, Euijoon	Student (4th)
KIM, Min Young	Student (3rd)
CHOI, Seonhoo	Professor
HA, Jeongsu	University Staff

University of Hong Kong

HEO, Chan	Student (2nd)
HO, Meng Chit	Student (2nd)
LI, Pak Yi	Student (2nd)
YEUNG, Ryan Wai-Yen	Student (2nd)
WONG, Sau Hei	Student (4th)
CHEN, Sidong	University Staff

Tohoku University

OURA, fumiya	Student (3rd)

Rikkyo University

TAWARA, Masashi	Student (4th)
TAKESHIGE, Shoko	Student (4th)

" trial enrollment "

Phillips Exeter Academy

PARK, William	High school student
ZHANG, Angelina	High school student
YU, Tony	High school student
CHEN, Leonard	High school student
PETERSON, Kadeine M.	Teacher (Biology)

Nishina School 2019 was operated by:

Lectures, Training and experiments

Seonhoo Choi, Jing Wu, Sidong Chen, Kanenobu Tanaka, Jeongsu Ha, Tokihiro Ikeda, Hiromi Sato, Takao Kojima, Sun Iimura, Jiajian Liu, Wenduo Xian, Yeung Tik Tsun

Logistics and …

Yu Naya, Tomomi Okayasu, Midori Yamamoto, Yuri Tsuburai, Yunike Shimizu,

Hideki Ueno (chair of Nishina school committee)
Hideto En'yo, Hideyuki Sakai (Nishina school committee)
Tohru Motobayashi, Hironobu Ishiyama ("school master")

Any feedback: to Hironobu Ishiyama (hironobu.ishiyama@riken.jp)
                         or Tohru Motobayashi (motobaya@riken.jp)