

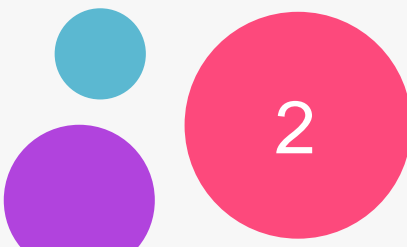


# ISBA and EIC

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# What is ISBA?

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## International School on Beam dynamics and Accelerator technology

- ISBA has been started from 2018 promoted by IINAS program by MEXT (Ministry of education + many things in Japan).
- Hiroshima university is the host of the school. All ISBA (ISBA18, ISBA19, and ISBA20) was (will be) held in Higashihiroshima city, near of Hiroshima University campus.
- The subject of the school is the beam dynamics and the technologies related to accelerator (RF, magnet, etc.).



IINAS

- Accelerator is now widely used from the fundamental science to industrial application.
- Innovation on the accelerator technology is important for this activity.
- Education on the accelerator science for the young researcher and graduate students is the key, because the human resource in the accelerator science is always lack.

## IINAS program

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- IINAS program is set to promote the school from this point of view by MEXT. It is operated by KEK.

## 1<sup>st</sup> Generation

Nuclear physicists developed the accelerator by themselves.

1930 Cockcroft-Walton (Taipei Imperial U.) ,

1937 Cyclotrons (Riken, Osaka U.),

1961 Electron synchrotron (U. of Tokyo)



## 2nd Generation

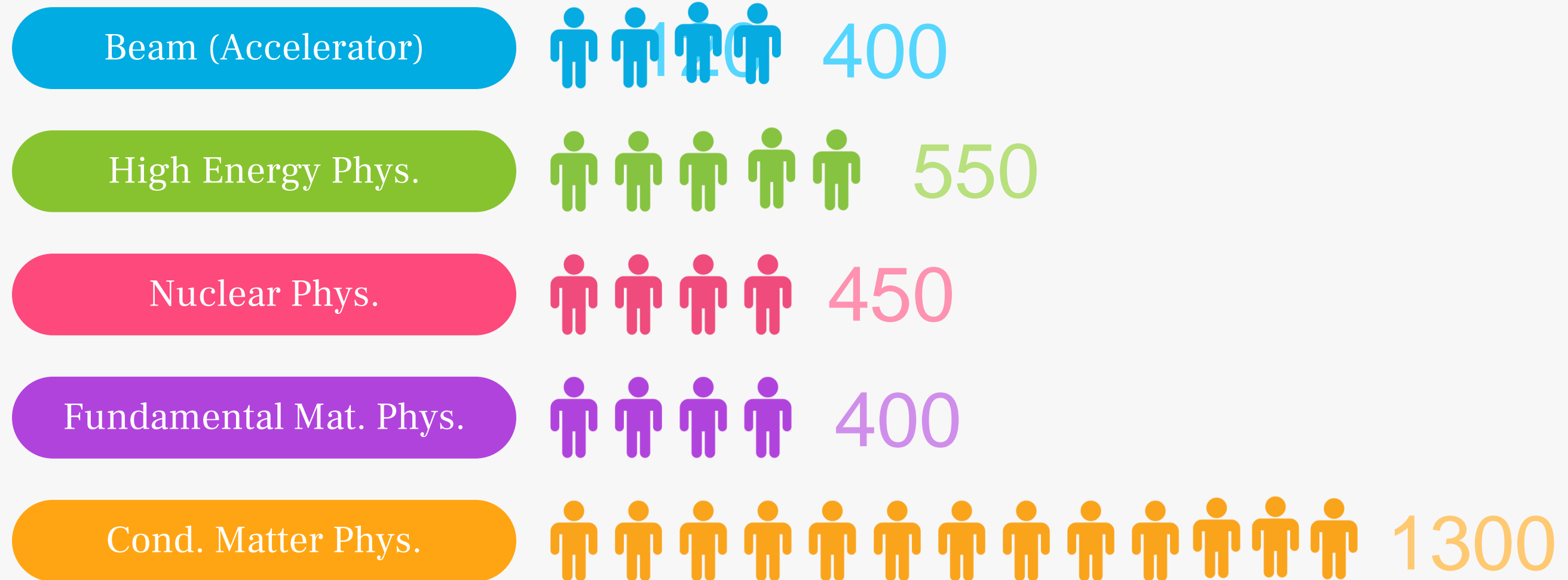
A group of accelerator scientists was formed as a division of KEK. The expertise was developed during the construction of KEK-PS. They were originally educated as nuclear/high-energy physicist, engineer, etc.

## 3rd Generation

Accelerator scientist educated as a professional of accelerator. The school is SOKENDAI(KEK), U. of Tokyo, Waseda U., Kyoto U., Osaka U., Hiroshima U. , but not so common.

# Number of Contributions

*Population of each discipline in Japanese Physical Society*



Number of contributions from the Beam society is much less than other disciplines.

Fraction of students of the Beam society is also much less.

# Aim of ISBA

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A Gateway to  
Accelerator  
Study



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Number of Graduate school where students can study the accelerator is very limited in Japan. ISBA is a gateway to the accelerator study for young researchers and graduate students to increase the number of researchers.



# Three functions

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*3 columns*



## Increase the number of researchers

Inspire the students and give them a strong motivation for accelerator studies.



## Internationalization

ISBA develops the connections among students and lecturers from different universities and countries. It can be base of the future collaboration.



## Carrier development


Certification of completion for ISBA curriculum contributes their carrier development.





# ISBA Curriculum

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Lectures

Hands-on

Excursion

Culture  
event

Banquet

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ISBA has been started 5 days school in 2018.

ISBA 2019 was extended to 7 days school. Hands-on training was introduced.

ISBA 2020 will be held with the same format as that in 2019.



## 16 Lectures

16 lectures (4 days) were given by lecturers from Japan, Korea, China, Taiwan, India, and Russia.



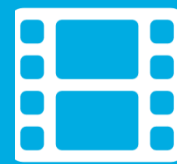
## Excursion

Students visited Atomic Bomb Peace Memorial park and Miyajima shrine.



## ISBA18

It was held as 5 days school. Number of students was 39.



## Night session

Students gave presentation about their studies in the night session.



## Culture Event

Students enjoyed the Japanese culture event provided by JICA (NPO).

Subject	Lecturer	Subject	Lecturer	Subject	Lecturer	Subject	Lecturer
Accelerator in Modern Science	M. Kuriki	Foundation of RF technology and NC Accelerator	Y. Kim	Laser Technology for accelerator	A. Aryshev	FEL and advanced light source	T. Tanaka
History of Accelerator	K. Yokoya	Super Conducting Technology for Accelerator	J. Gao	Foundation of RF technology and NC Accelerator	Y. Kim	Foundation of Radiation process	L. SUKHIKH
Beam Dynamics Foundation	H. Okamoto	Foundation of Linear Accelerator	A. Deshpande	Foundation of Colliders	K. Yokoya	Laser Compton and its Application	Y. Honda
Foundation of Synchrotron and storage ring	J. Gao	Particle Generation (electron, positron, ion)	M. Kuriki	Foundation of SR	J. Chen	Review of Medical Accelerator	L. SUKHIKH
Night session	Students	Night session	Students	Night session	Students	Night session	Students



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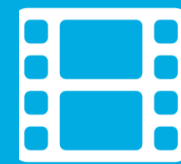
## Student Presentation

The results of Hands-on was presented by students. Award is also given.



## ISBA19

It was held as 7 days school. Number of students was 38.



## Hands-on training

Hands-on training for accelerator design with a simulation (ASTRA) was held.



## Award ceremony

At the end of the school, the award ceremony was held.

Accelerator in Modern Science	Foundation of Superconducting accelerator	Foundation of Synchrotron and storage ring	Introduction to Particle Accelerator Simulation	Beam Diagnostic technique	Hands-on summary
Foundation of Normal conducting accelerator	Beam Dynamics Foundation 2	Foundation of SR	Tutorial of ASTRA	Post simulation process	Hands-on summary
Beam Dynamics Foundation 1	Accelerator Applications (ind. and med.)	Foundation of Colliders	Hands-on training	Hands-on training	Student summary presentation
Particle Generation (electron, positron, ion)	Foundation of Linear Accelerator	Foundation of FEL	Hands-on training	Hands-on training	Student summary presentation
Night session by students	Banquet	Night session by students	Night session by students	Night session by students	Dinner & Award ceremony

# ISBA and EIC

*Global promotion of science*

- All big projects by accelerators are global.
- Any project couldn't succeed without collaboration.
- Human resource development (education and training) should be also shared by regions.
- Global human resource development is one of the most important issue for SDGs in Science.

# Three Accelerator Schools in the World

*Three is more than three times of one.*



## Two major accelerator schools

Currently, there are two major accelerator schools in the world, USPAS and CAS, but no schools in Asia.

## Three schools in the world

If ISBA becomes major, a big synergy is expected by information and human exchange. Big contributions to all of the global projects.



# Summary

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## What is ISBA

ISBA is an international accelerator school in Asian region by IINAS program.

## Accelerator Education

A large demand on the accelerator researcher, but opportunity is limited.

## Aim of ISBA

Gateway to Accelerator study for graduate students and young researchers.

## ISBA Curriculum

ISBA curriculum contains lectures, hands-on training, night session, excursion, etc.

## ISBA and EIC

A synergy is expected by the three schools in the world as a big contribution to global accelerator projects.