

The 3rd Test Beam Experiment @ELPH in Tohoku Univ.

G. Nukazuka (RBRC)

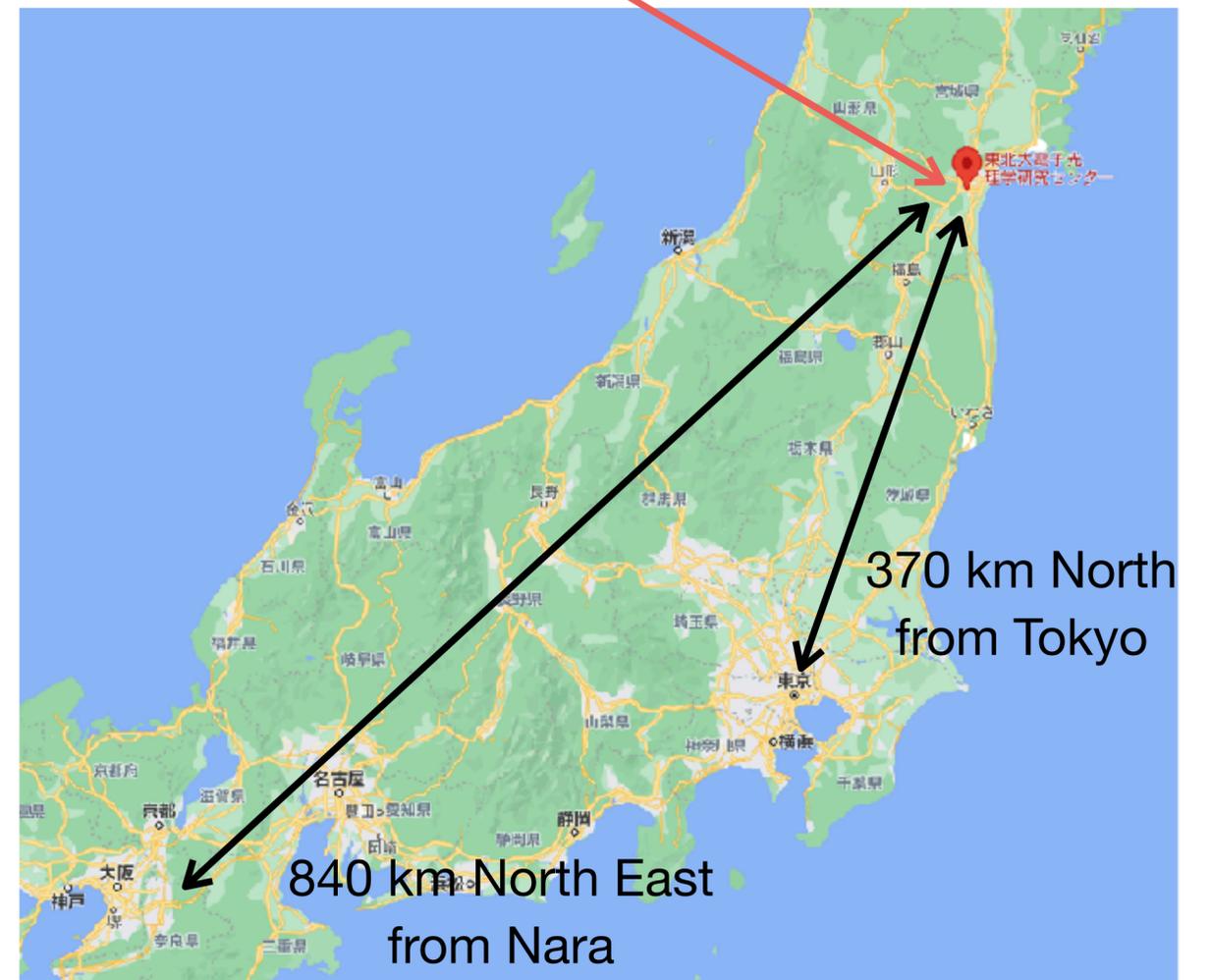
List of Events

- Jul/30/2021 Proposal submission
- Aug/3/2021 Interview
- Sep/2/2021 Approval

Beam Time Candidates:

- ~~Nov/15/2021 - 19~~
- **Dec/ 7/2021 - 10 : Beam Time!!!**
- ~~Jan/25/2021 - 28 : we assigned tentatively~~

Genki physically join the experiment, i.e. he'll travel to Japan for a month due to self-quarantine of 2 weeks when entering Japan.



Purpose

Determination of the detection efficiency

Past beam experiments showed 96% efficiency. But it must be almost 100%.

Mismatch of the BCO phase and beam can explain the reason.

We are ready to take the external trigger information and BCO phase with the CAMAC system.

Cosmic-ray measurements with the CAMAC system showed 98% efficiency. More improvements are not easy since statistics are limited, optimization of the geometry is so delicate.

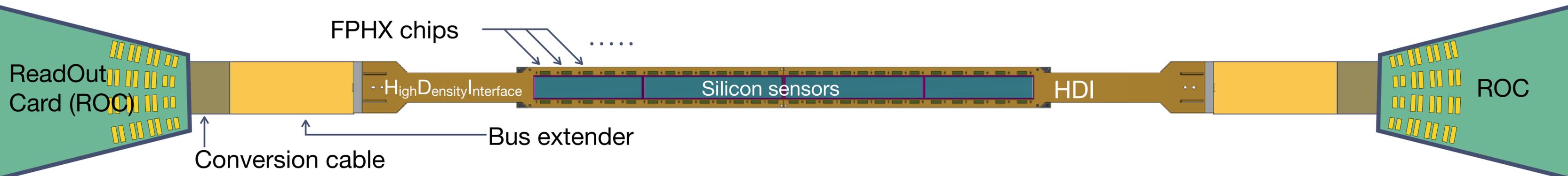
→ We need test beam measurements with the CAMAC system to proof ~100% efficiency

Beam measurements with the production ladders

We need to see performance of the production ladder with a beam.

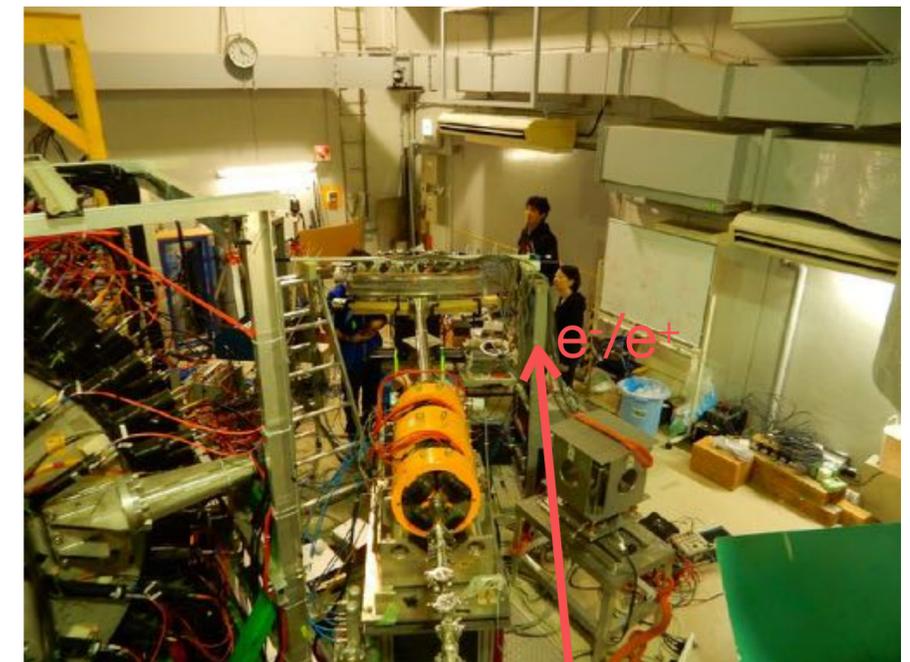
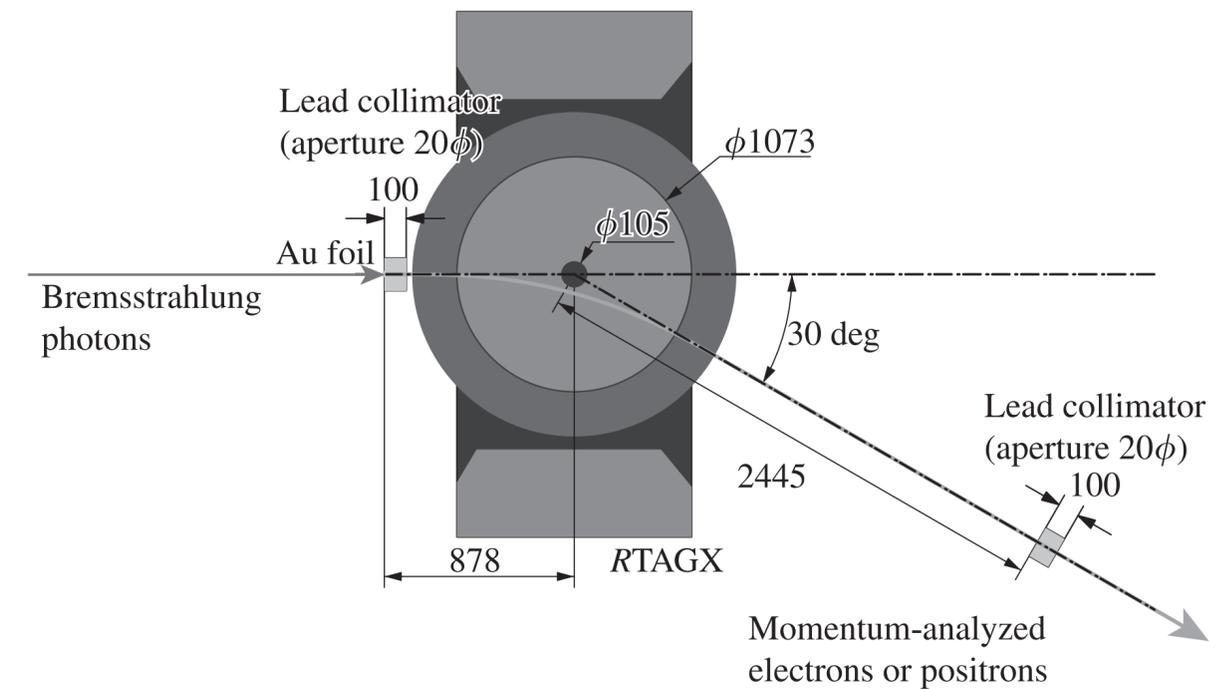
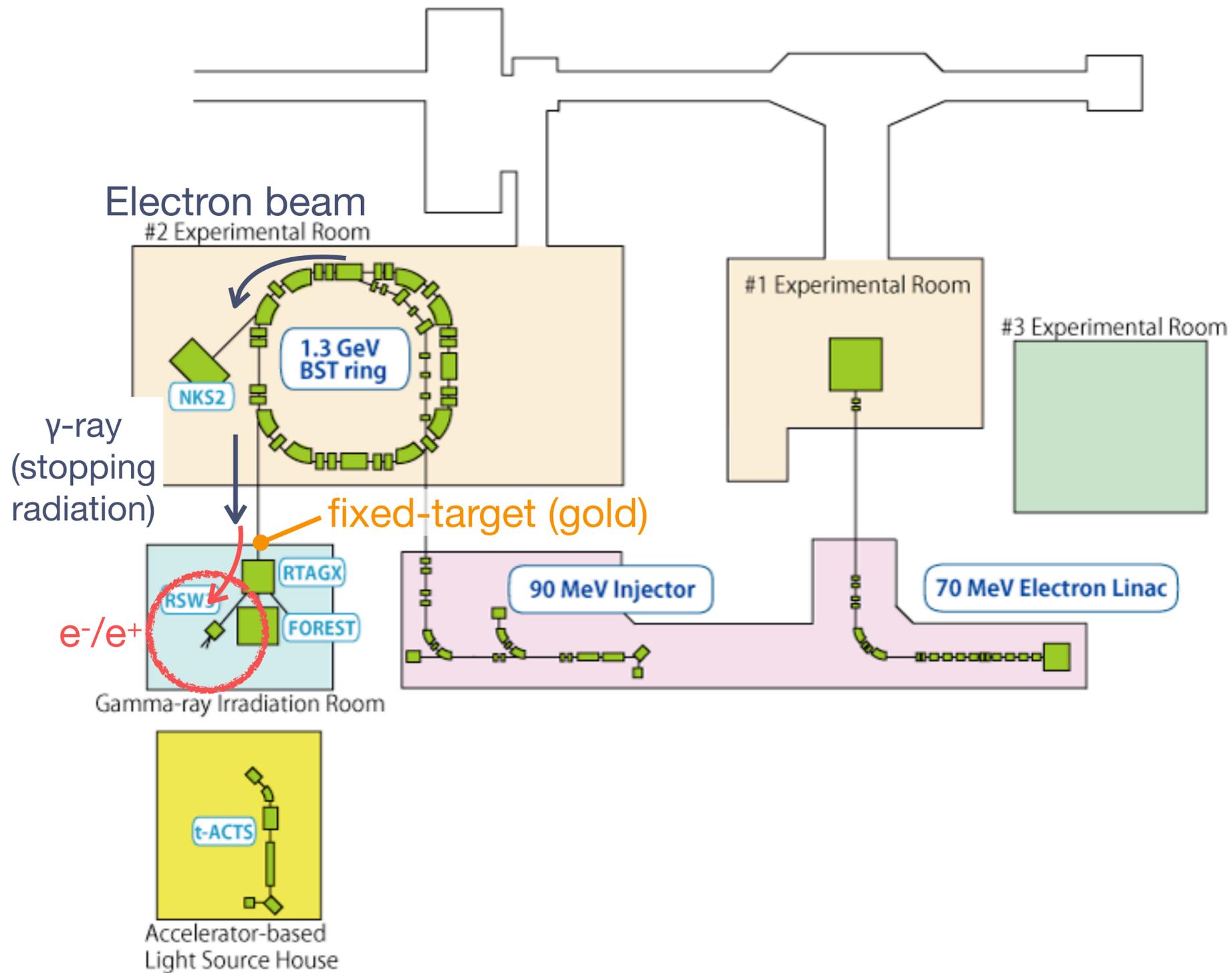
Beam measurements with the latest bus extenders and the co-axial conversion cables

The design of the bus extender was finalized. We will get the co-axial conversion cable some months later. So they should be tested with a beam.



Research Center for **EL**ectron **PH**oton Science (ELPH)

[NIM A 694 \(2012\) 348](#)



Beam features@ELPH GeV- γ area

Electron test beam

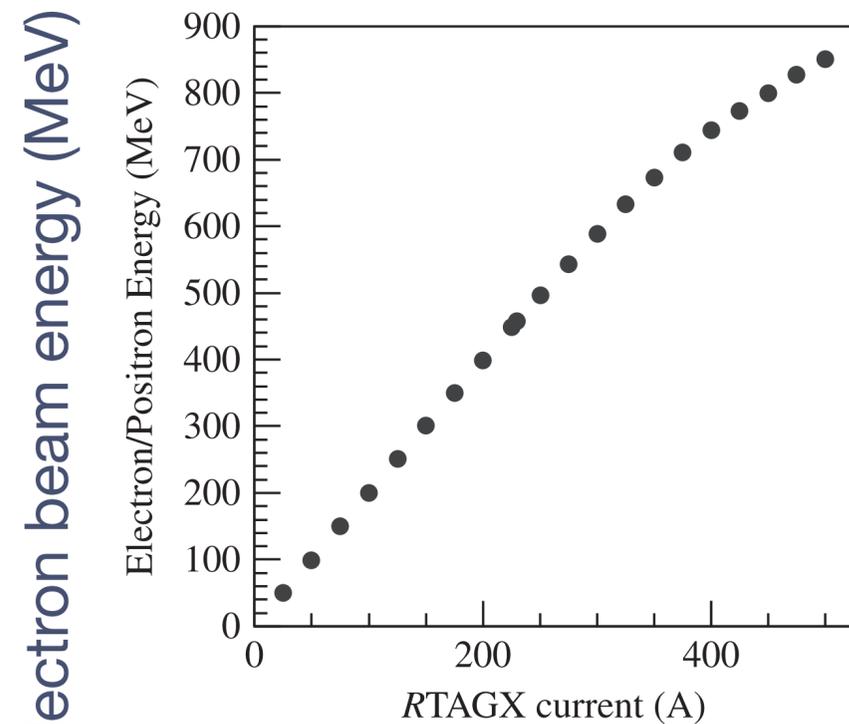
Beam	Beam line	Maximum beam energy
Positron / Electron	± 30 deg	~840 MeV
Positron	-23 deg	~1000 MeV

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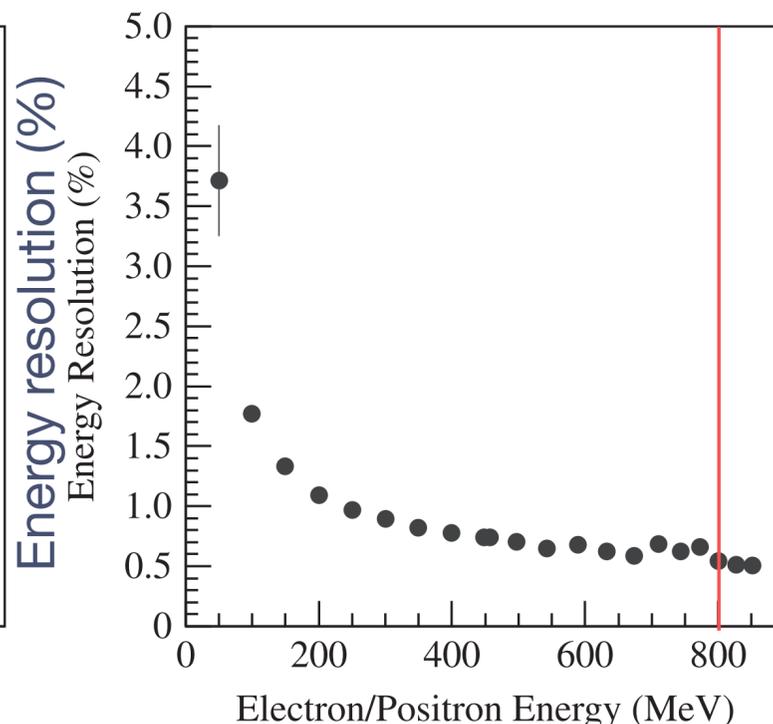
Tagged gamma-ray beam

Beam line	Energy Range (R _{int} Energy: 1.3 GeV)	# of Bins	Intensity	Duty
BST-Tagger-I	0.8 ~ 1.26 GeV	160	TBC	~60% (NKS2)
BST-Tagger-II	0.9 ~ 1.25 GeV	116	TBC	~50% (FOREST)

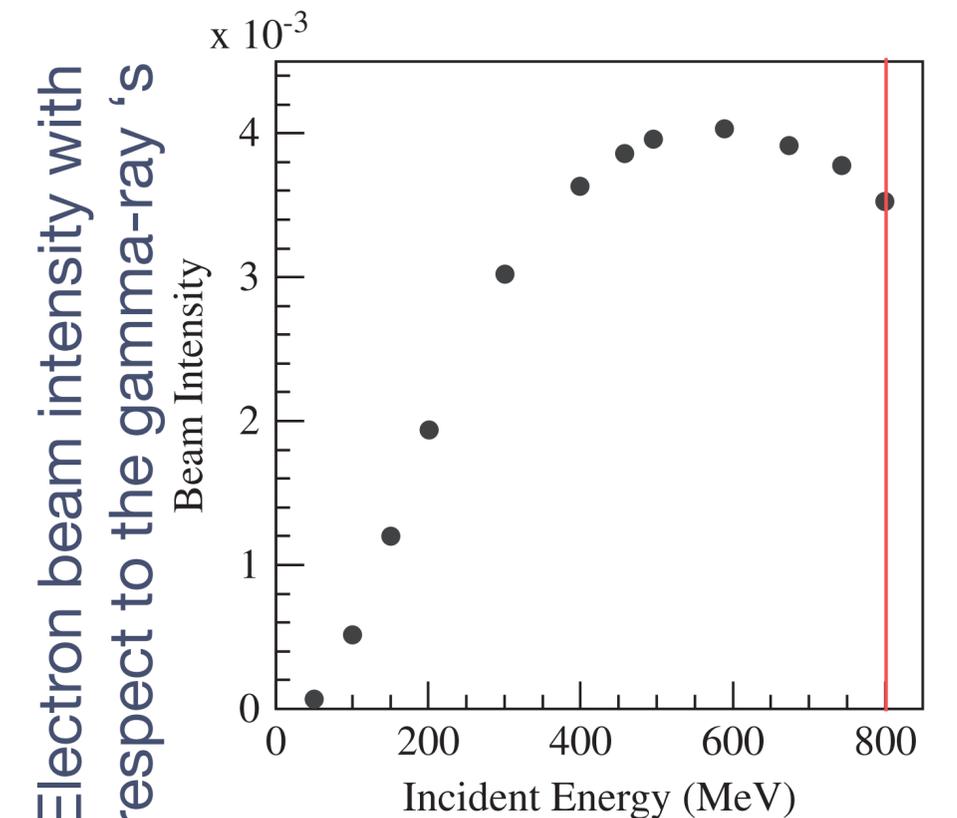
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Current for the magnet (A)



Electron beam energy (MeV)



Gamma-ray energy (MeV)

Tentative Member

RIKEN, RBRC

- Staff: Genki, Akiba, and Nakagawa

NWU

- Staff: T. Hachiya, Maya
- Master students: Mika, Miu, Yumika, and Runa
- Bachelor students: Yuka, Mai, and Misaki,

Rikkyo Univ.

- Master student: Hikaru
- Bachelor students: Genta, Yusuke

JAEA

- Staff: Shoichi

Ministry of Foreign Affairs of Japan
外務省

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Consular Services

Border enforcement measures to prevent the spread of novel coronavirus (COVID-19)

August 18, 2021
Japanese

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- 1. Denial of permission to entry
- 2. Denial of the re-entry from certain countries/regions designated in response to coronavirus variants of special concern on border measures(New)
- 3. Quarantine measures (New)
- 4. Suspension of visa validity
- 5. Suspension of visa exemption measures
- 6. Restrictions on airport/ports for arrival
- 7. Entry of foreign nationals with special exceptional circumstances

1. Denial of permission to entry

For the time being, foreign nationals who have stayed in any of the following 159 countries/regions within 14 days prior to the application for landing are denied to enter Japan in pursuant to the Article 5, paragraph (1), item (xiv) of Immigration Control and Refugee Recognition Act, unless special exceptional circumstances are found. Note that foreigners (from the countries and regions where the entry bans do not apply) are not denied to enter Japan even when they arrive in Japan via those countries or regions, which are subject to denial of permission to entry, for refueling or transit purpose. Those who entered those countries or regions will, however, be subject to the entry ban.

Please see [this page](#) for further information about the denial of landing to prevent the spread of COVID-19.

Countries/Regions subject to denial of permission to enter Japan:

Asia
Bangladesh, Bhutan, Cambodia, India, Indonesia, Malaysia, Maldives, Mongolia, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Thailand, Timor-Leste

North America
Canada, United States of America

5. Suspension of visa exemption measures

As visa exemption measures with the countries and regions listed below are temporarily suspended, those who fall under the measures are required to obtain visas before visiting Japan. Australia, New Zealand and Taiwan have been newly added to the list (1) and (2) below. The measures will be in place for the time being.

(1) Visa exemption measures agreed with Japan and the following countries and regions

Asia
Bangladesh, Brunei, Cambodia, Hong Kong, India, Indonesia, Republic of Korea, Laos, Macau, Malaysia, Mongolia, Myanmar, Pakistan, Singapore, Taiwan, Thailand, Viet Nam

Oceania
Australia, Nauru, New Zealand, Palau, Papua New Guinea, Samoa, Solomon

Latin America and the Caribbean
Argentina, Bahamas, Barbados, Colombia, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Mexico, Paraguay, Peru, Suriname, Uruguay

Europe
Andorra, Austria, Azerbaijan, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Italy, Kazakhstan, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, Netherlands, Norway, Poland, Portugal, Romania, San Marino, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkmenistan, Ukraine, United Kingdom, Uzbekistan, Vatican

Middle East
Israel, Iran, Oman, Qatar, United Arab Emirates

Africa
Lesotho, Tunisia

(2) The effect of Pre-Clearances (i.e. visa exemptions) granted by the Japanese Government to APEC Business Travel Card (ABTC) issued by the following countries and regions is also suspended.

Australia, Brunei, China, Hong Kong, Indonesia, Republic of Korea, Malaysia, Mexico, New Zealand, Papua New Guinea, Peru, Philippines, Russia, Singapore, Taiwan, Thailand, Viet Nam

Tentative Member

RIKEN, RBRC

- Staff: Genki, Akiba, and Nakagawa

NWU

- Staff: T. Hachiya, Maya
- Master students: Mika, Miu, Yumika, and Runa
- Bachelor students: Yuka, Mai, and Misaki,

Rikkyo Univ.

- Master student: Hikaru
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JAEA

- Staff: Shoichi

It's not easy to come to Japan for foreign people 😞

https://www.mofa.go.jp/mofaj/ca/fna/page4_005130.html

The screenshot shows the official website of the Ministry of Foreign Affairs of Japan. The page title is "Border enforcement measures to prevent the spread of novel coronavirus (COVID-19)". The main content area contains a large blue box with the text: "foreign nationals who have stayed in any of the following 159 countries/regions within 14 days prior to the application for landing are denied to enter Japan unless special exceptional circumstances are found". Below this, there is a list of countries/regions subject to denial of permission to enter Japan, categorized by region: Asia (Bangladesh, Bhutan, Cambodia, India, Indonesia, Malaysia, Maldives, Mongolia, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Thailand, Timor-Leste), North America (Canada, United States of America), and others. A second blue box at the bottom states: "As visa exemption measures with the countries and regions listed below are temporarily suspended, those who fall under the measures are required to obtain visas before visiting Japan." The page also includes navigation menus, a search bar, and social media sharing options.

To Do List before the Experiment

	Priority	Hardware/ Software	Timing	Details	Assigned Person
Darkbox	must	Hardware	right now~	Mandatory	?
Multiple ladder operation	must	Hardware	Sep	It must be tested right now. 2(3) are possible at RIKEN(NWU)	Students at NWU and Rikkyo
testbench DAQ + CAMAC	high	Hardware	Sep~Nov	Maintenance and optimization are needed.	Genki, Yumika
Migration to Windows10 (1)	high	Both	Sep	The testbench will be operated remotely. So it should be done with Windows10. Already started.	Genki, Hikaru, Itaru
Migration to Windows10 (2)	high	Both	Oct	test bench DAQ + CAMAC should be run on Win10.	Hikaru, Yumika
Analysis preparation	mid	Software	Oct~Dec	Preparations, modifications, and optimizations for the checking macro, GUI, and calculation of the detection efficiency should be done in advance.	Genki, Miu
Geant4 simulation	mid	Software	Sep~	If it's done before the experiment...	?
Bias cables	low	Hardware	Sep	They should be tested. The adaptors for them should be checked.	Anybody at RIKEN and NWU
Cooling for the ladders and the ROC	low	Hardware	Nov	Air cooling should be enough probably.	Rikkyo students
Cables production	low	Hardware		Some spare cables are needed.	Rikkyo students
Data sharing	low	Software	Nov	Data should be shared among us in real time.	Young students

Local people will work for hardware tasks.

Some volunteers are really welcomed for software tasks.

The dark box

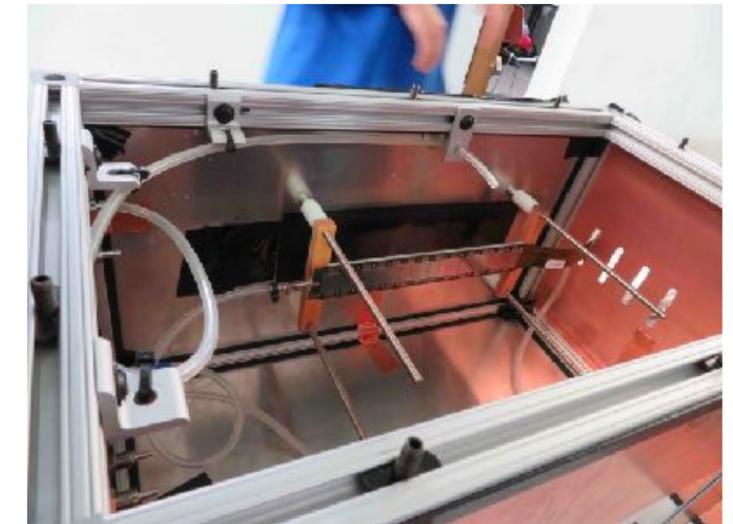
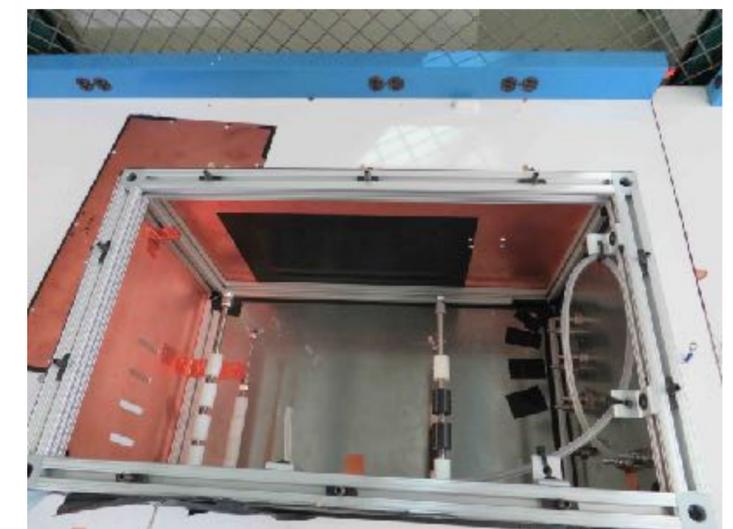
No drawing of the dark box for the 2nd text beam experiment is available.

No drawing of the dark box for the 3rd text beam experiment (2020) is available.

→ We need to start from scratch.

Wei ang Hang-Sheng agreed to help making a drawing.

Genki is summarizing ideas and requirements for the box.



Requirement

- Dimensions in mm
- 3 or 4 full ladders can be fixed
 - the fixed ladders are aligned along the beam axis
 - the fixed ladders can be shaded
- HDIs on a side can be accessed without opening the box
 - although full ladders are fixed, only the access to half ladders on a single side is enough
- Beam entrance windows (both upstream and the downstream) are needed
 - if a black curtain covers the fixture for shading, the windows can be just holes
 - if the shading is achieved by closing the fixture, thin foil or tape should be attached on the windows
- The vertical position of the fixture can be adjusted easily about ± 5 cm. The position should be fixed.
- The tilt of the fixture (around the beam-axis, and the horizontal-axis) can be adjusted. The position should be fixed.
- No need to consider water cooling
- Should we monitor the temperature of the ladders?

The dark box used in 2019.

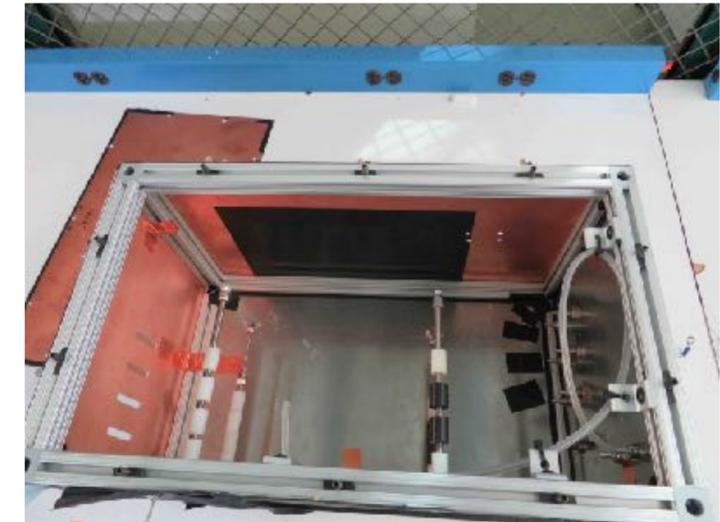
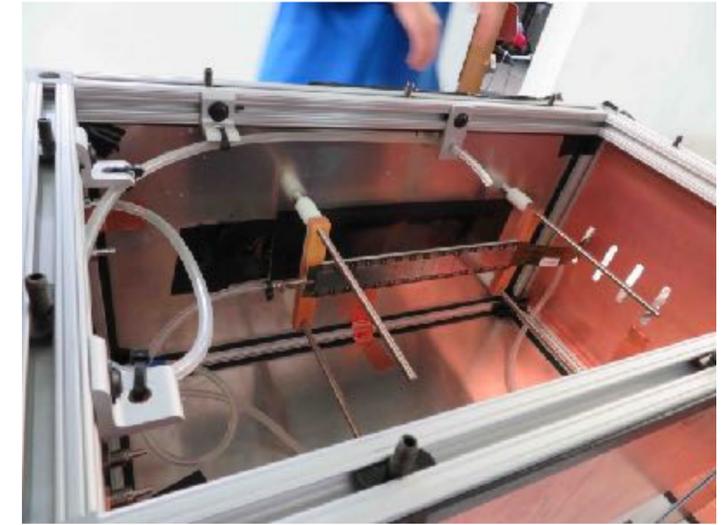
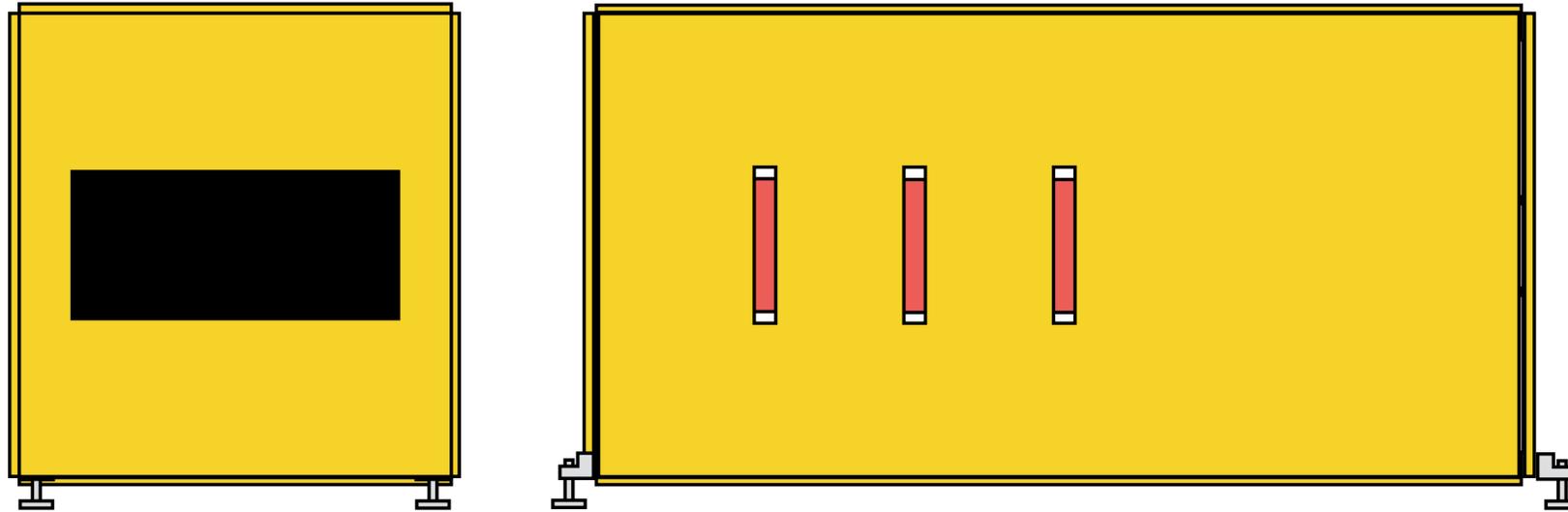
The idea of the fixture for the 3rd exp.@ELPH

Basically, the same structure as 2019's is fine.

Aluminum frames form the outer frame.

Metal plates are fixed on the outside of the frame as walls.

4 Rods go through the holes on the ladder's frame for fixation. Spacers are put between ladders. The rods are fixed to the upstream wall.

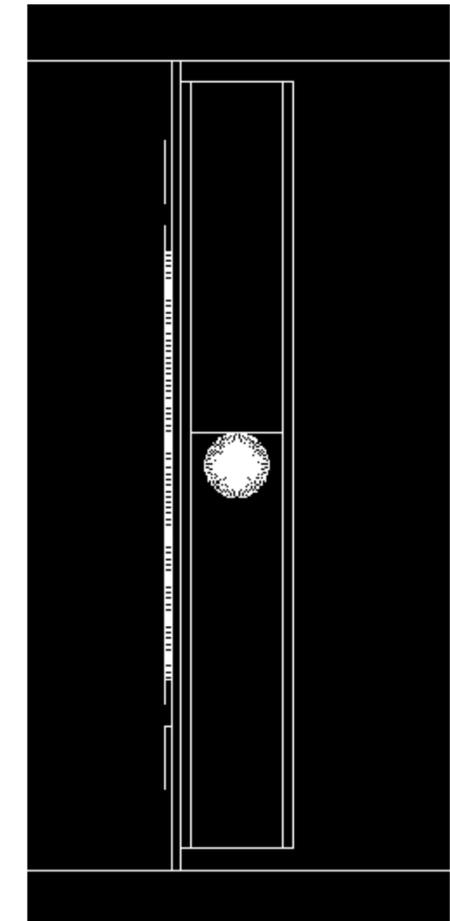
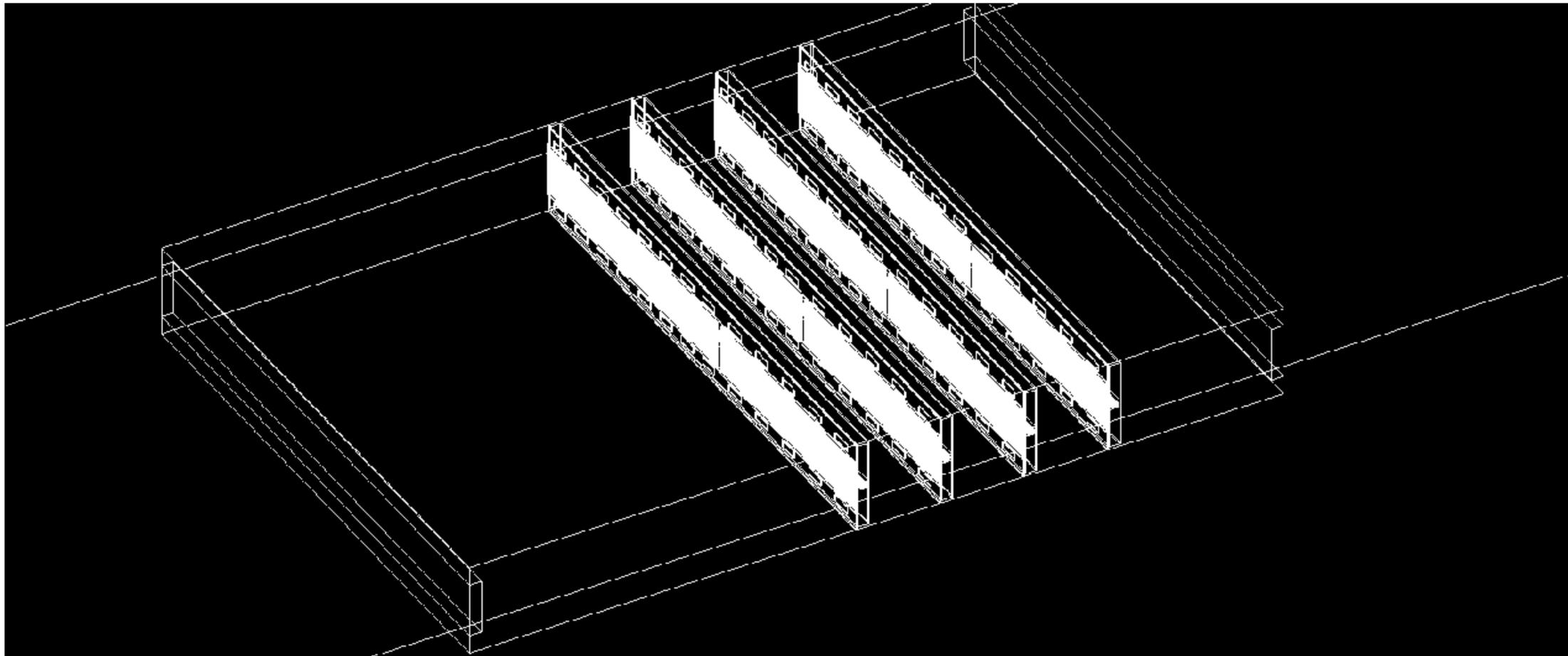


Geant4 simulation

Cheng-Wei provided his codes. He also join this task. Discussion already started by e-mail. One more volunteer is welcomed.

What to do

- Effect of multiple scattering by materials in the upstream to sensors in the downstream.
- Energy deposit study: inconsistency found in the results from the 2nd test beam experiment and a simulation
- Test of tracking algorithms and detection efficiency calculation



from Cheng-Wei

Schedule

2021後期ビームタイム

加速器メンテナンス A部運転

第二実験室(NKS) GeV- γ 実験室

同時運転不可 本体室

2021/9/1 更新

2021 10月		2021 11月		2021 12月		2022 1月		2022 2月		2022 3月			
1金		1月	屋 金田(2982)	1水		1土	冬期休業	1火	Bachelor&Master defense season at Rikkyo	1火	Bachelor defense season at NWU		
2土		2火		2木		2日				2水			2水
3日		3水		3金	夜 永尾(2981)	3月		3木				3木	
4月	RIPF-U	4木	屋 永尾(2981)	4土	全 永尾(2981)	4火	予備日	4金				4金	
5火	菊永(2947)	5金	屋 永尾(2981)	5日	全 永尾(2981)	5水			5土		5土		
6水	屋 末原(2975)	6土		6月	屋 本多(2973)	6木			6日		6日		
7木	屋 末原(2975)	7日		7火	屋 本多(2973)	7金			7月	屋 白鳥(2976)	7月	RIPF-K	
8金	屋 末原(2975)	8月		8水	屋 本多(2973)	8土			8火	屋 白鳥(2976)	8火	夜 永尾(2981)	
9土		9火		9木	屋 本多(2973)	9日			9水	屋 白鳥(2976)	9水	全 永尾(2981)	
10日		10水		10金	屋 本多(2973)	10月			10木		10木	全 永尾(2981)	
11月		11木	屋 蔵満(2988)	11土		11火			11金	Master defense season at NWU	11金	後藤(2967)	
12火	共同研究H	12金	屋 蔵満(2988)	12日		12水		長谷川(2985)	12土			12土	
13水	後藤(2967)	13土		13月		13木			13日		13日		
14木	屋 金田(2982)	14日		14火	屋 佐藤(2980)	14金		14月		14月	A部予約		
15金	豊嶋(2987)	15月	屋 本多(2973)	15水	屋 佐藤(2980)	15土	RIKEN APR deadline around here	15火	菊永(2946)	15火	JPS annual meeting		
16土		16火	屋 本多(2973)	16木	屋 佐藤(2980)	16日			16水	RI候補日		16水	
17日		17水	屋 本多(2973)	17金		17月			17木	RI候補日		17木	
18月		18木	屋 本多(2973)	18土		18火		18金	豊嶋(2987)	18金			
19火	施設見学	19金	屋 本多(2973)	19日		19水		19土		19土			
20水	屋 中村(2977)	20土		20月	屋 青木(2974)	20木	屋 大西(2979)	20日		20日			
21木	屋 中村(2977)	21日		21火	屋 青木(2974)	21金	屋 大西(2979)	21月	屋 本多(2973)	21月			
22金	屋 中村(2977)	22月		22水	屋 青木(2974)	22土		22火	屋 本多(2973)	22火	菊永(2946)		
23土		23火		23木	屋 青木(2974)	23日		23水	屋 本多(2973)	23水	RIPF-K		
24日		24水	大浦(2968)	24金	後藤(2967)	24月		24木	屋 本多(2973)	24木	菊永(2947)		
25月		25木	菊永(2947)	25土		25火	屋 糠塚(2984)	25金	屋 本多(2973)	25金	RI候補日		
26火	屋 山田(2972)	26金	屋 永尾(2981)	26日		26水	屋 糠塚(2984)	26土		26土			
27水	屋 山田(2972)	27土		27月	予備日	27木	屋 糠塚(2984)	27日		27日			
28木	長谷川(2985)	28日		28火	冬期休業	28金	屋 糠塚(2984)	28月		28月	予備日		
29金		29月	屋 大西(2963)	29水			29土		29火				
30土		30火	屋 大西(2963)	30木			30日		30水				
31日				31金		31月	予備日			31木			

October

November

December

January

February

March