

ERL2015 Report (part2 : 見学ツアー他)

ワークショップ期間 : 2015/6/7 - 12

ERL検討会 2015/06/25

T. Obina

BNL 見学ツアー

スクールバスで30分



BNL入口で手続き



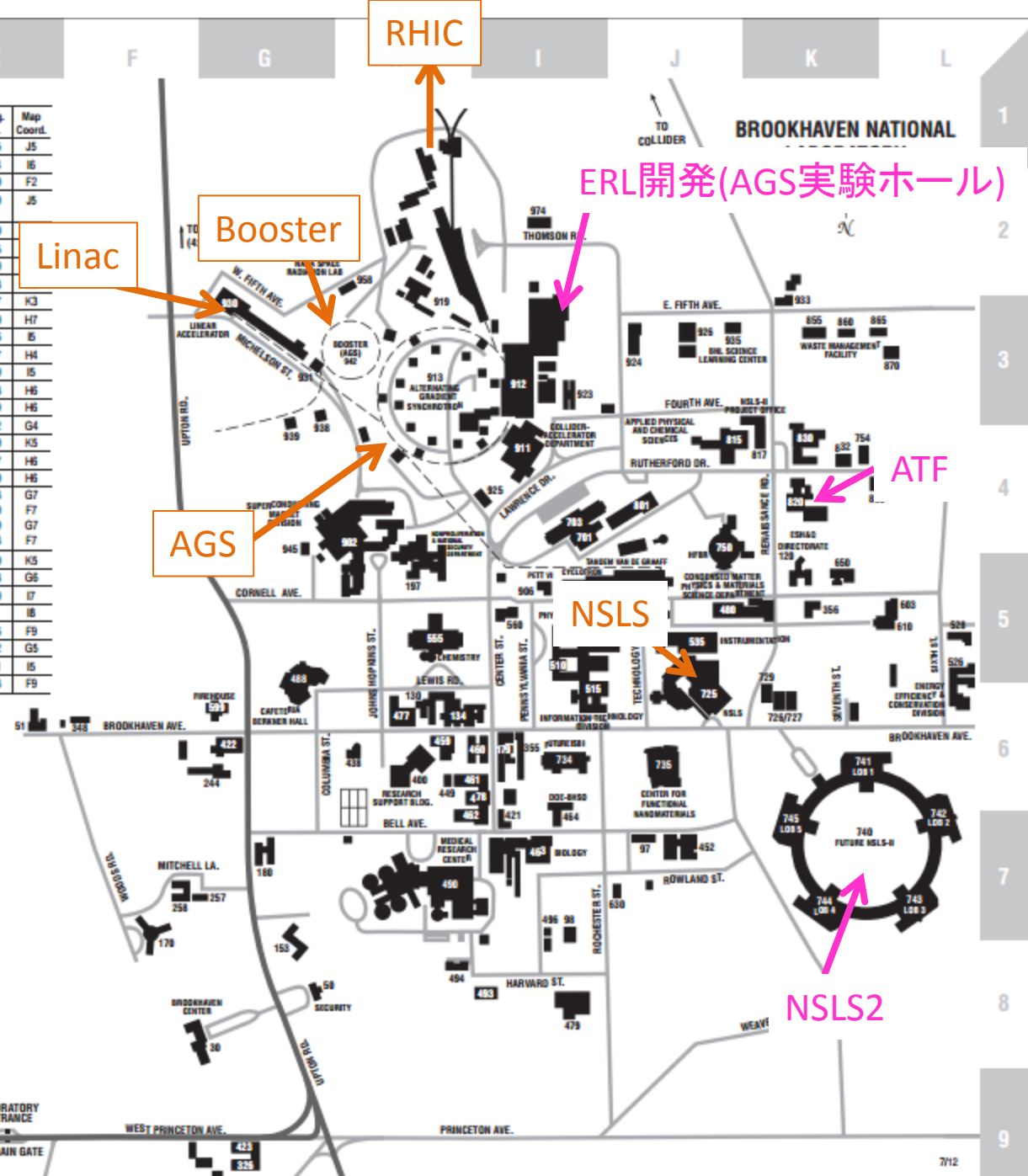
引率のおねえさん



ERL開発場所: SRFも同じ場所で開発

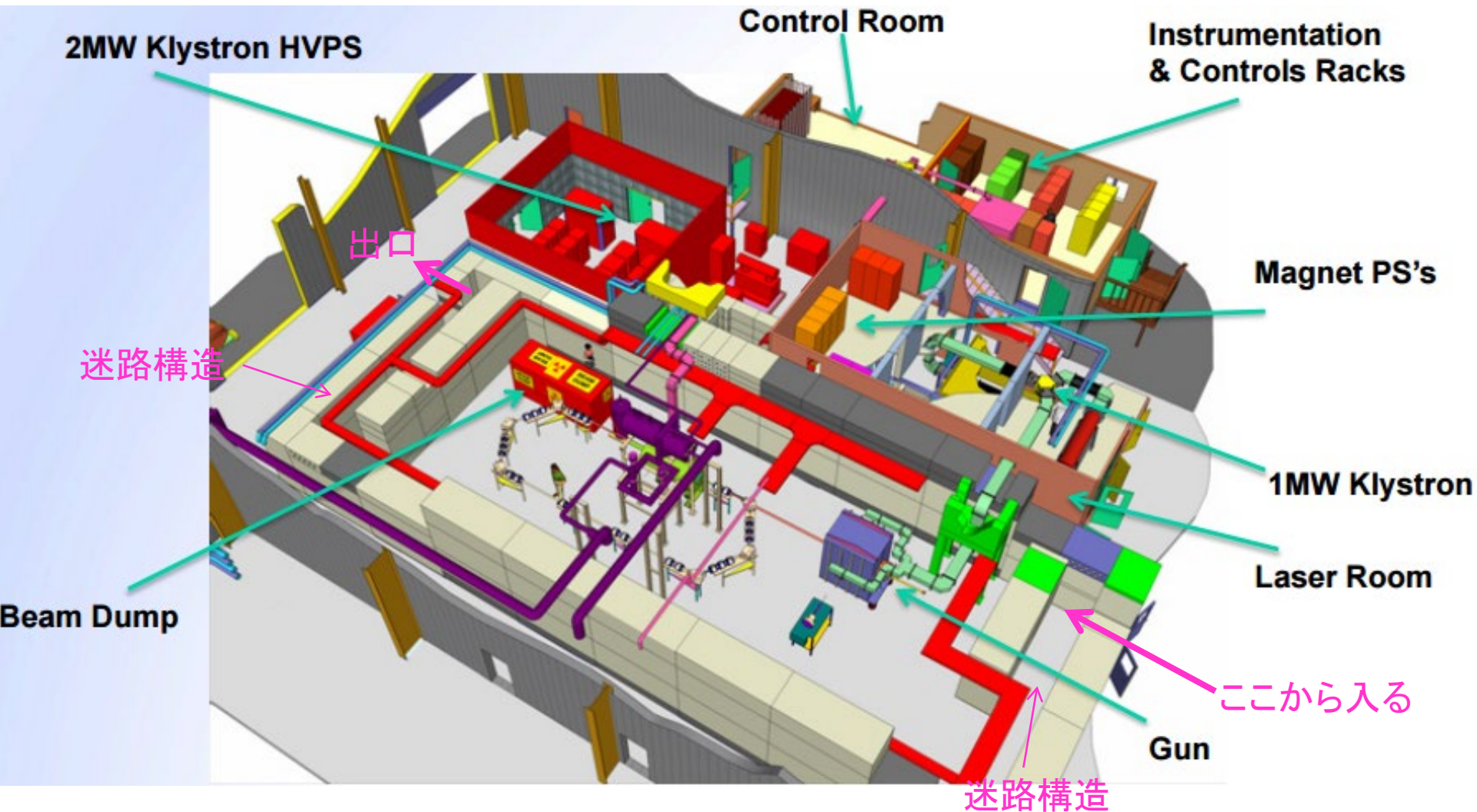


BUILDING NAME	Bldg. No.	Map Coord.	BUILDING NAME	Bldg. No.	Map Coord.
Accelerator Test Facility	820	K4	Instrumentation Division	535	J5
Administration, Director's Office	460	H5	Interdisciplinary Science Building I	734	I6
AGS Exp. Area	912	I3	Linear Accelerator - 200 MEV	930	F2
AGS Ring	913	H3	Condensed Matter Physics & Materials Science Dept.	480	J5
Badging Group	400	H6	Medical Research Center	490	
Berliner Hall/Cafeteria	488	G5	National Synchrotron Light Source	725	
Biology Department	463	I7	National Synchrotron Light Source II	740	
BNL Science Learning Center	935	J3	NSLS-II Offices	703	
BNL Science Learning Center Staff Office	400	H6	NSLS-II Project Office	817	K3
BNL Video	493	H8	Occupational Medicine Clinic	490	H7
Booster (AGS)	942	G3	PETT VI	906	I5
Brookhaven Center	30	F8	Production Services	197	H4
Brookhaven Linac Isotope Producer (BLIP)	931	G3	Physics	510	I5
Business Systems Division	1005S	I5	Pool/Gymnasium	478	H6
CAD Installation Complex	933	K2	Post Office	179	H6
Carpentry/Signs Shops	422	F6	Quality Management Office	902	G4
Cavendish House	153	G7	Radiological Controls Division	120	K5
Center for Functional Nanomaterials (CFN)	735	J6	Research Library	477	H6
Central Shops	479	I8	Research Support Building (RSB)	400	H6
Chemical Sciences Division (ESD)	815	J4	Residences	153	G7
Chemistry Dept.	555	H5		170	F7
Collider Accelerator Department	911	I4		180	G7
Community Involvement, Government & Public Affairs	400	H6		258	F7
Compton House	170	F7	Safety & Health Services Division	120	K5
Credit Union	400	H6	Science Education Center	438	G6
Curie House	258	F7	Service Station	630	I7
DOE-BSHO	464	I6	Shipping & Receiving	98	I8
Economic Development & Technology Transfer	490	H7	Site Maintenance	326	F9
Energy Efficiency and Conservation Division	526	L5	Superconducting Magnet Division	902	G5
Energy Sciences & Technology Department	130	H6	Tandem Van de Graaff/Cyclotron	901	I5
Environmental and Waste Technology Center	830	K4	Vehicle Repair	423	F9
Environmental Biology & Instrumentation (ESD)	490	H7			
Environmental Chemistry (ESD)	815	J4			
Environmental Protection Division	120	K5			
Facilities & Operations	461	H6			
Fiscal	400	H6			
Fleming House	180	G7			
Guest House	257	F7			
Guest, User, Visitor Center	400	H6			
High-field MRI	560	I5			
Housing/Transportation/Travel	400	H6			
Human Resources	400	H6			
Internal Audit & Oversight Office	400	H6			
Information Technology	515	I5			



ERL Facilityのレイアウト

- Toby Mirror 氏のプレゼンより抜粋
- 制御室、Magnet電源、Instrumentationラック等は見学できず



シールド壁

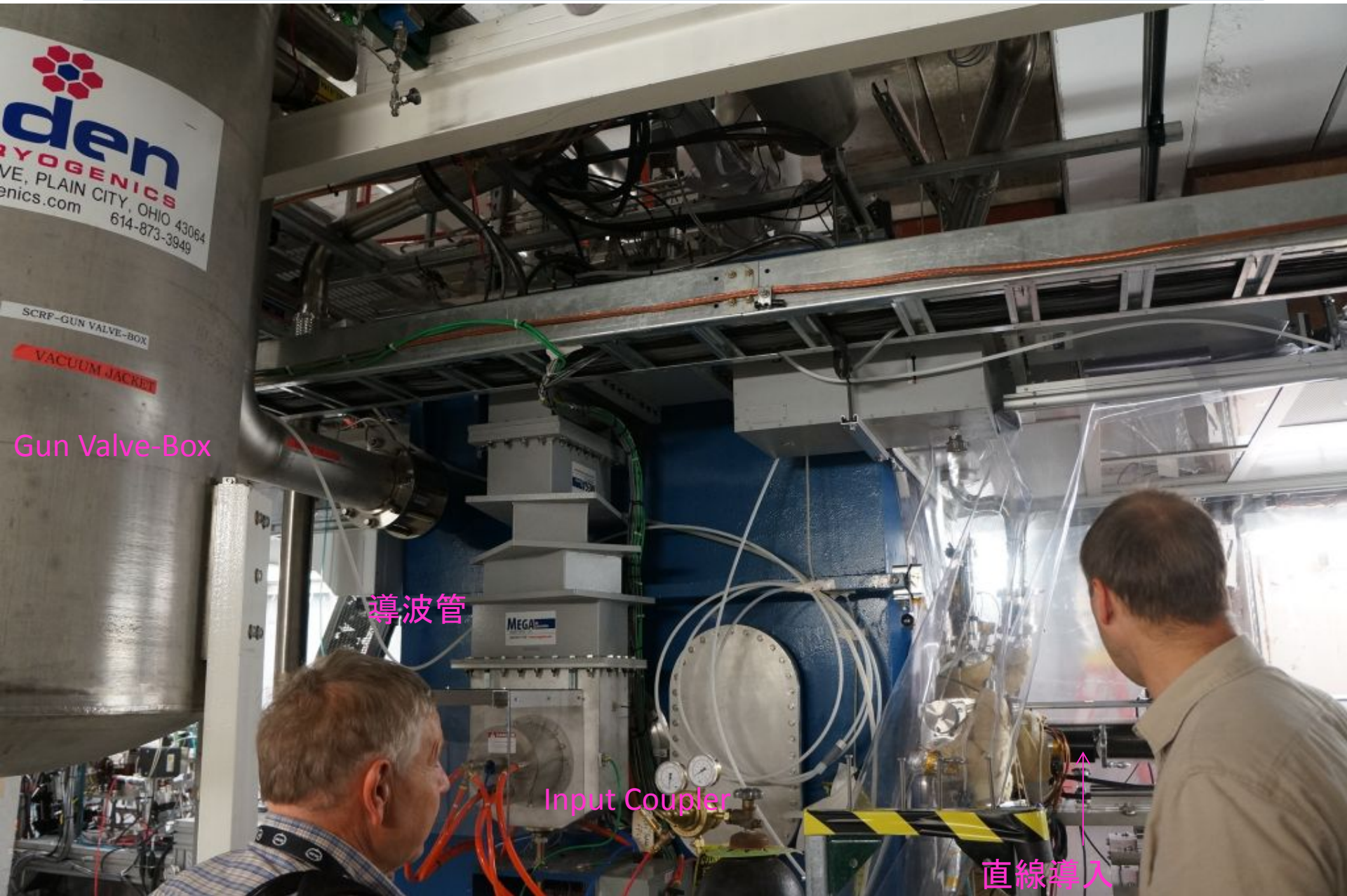
クレーン

コンクリートシールド

出入口



SRF Gun : 案内は D. Kayran



den
HYOGENICS
VE, PLAIN CITY, OHIO 43064
enics.com 614-873-3949

SCRFP-GUN VALVE-BOX
VACUUM JACKET

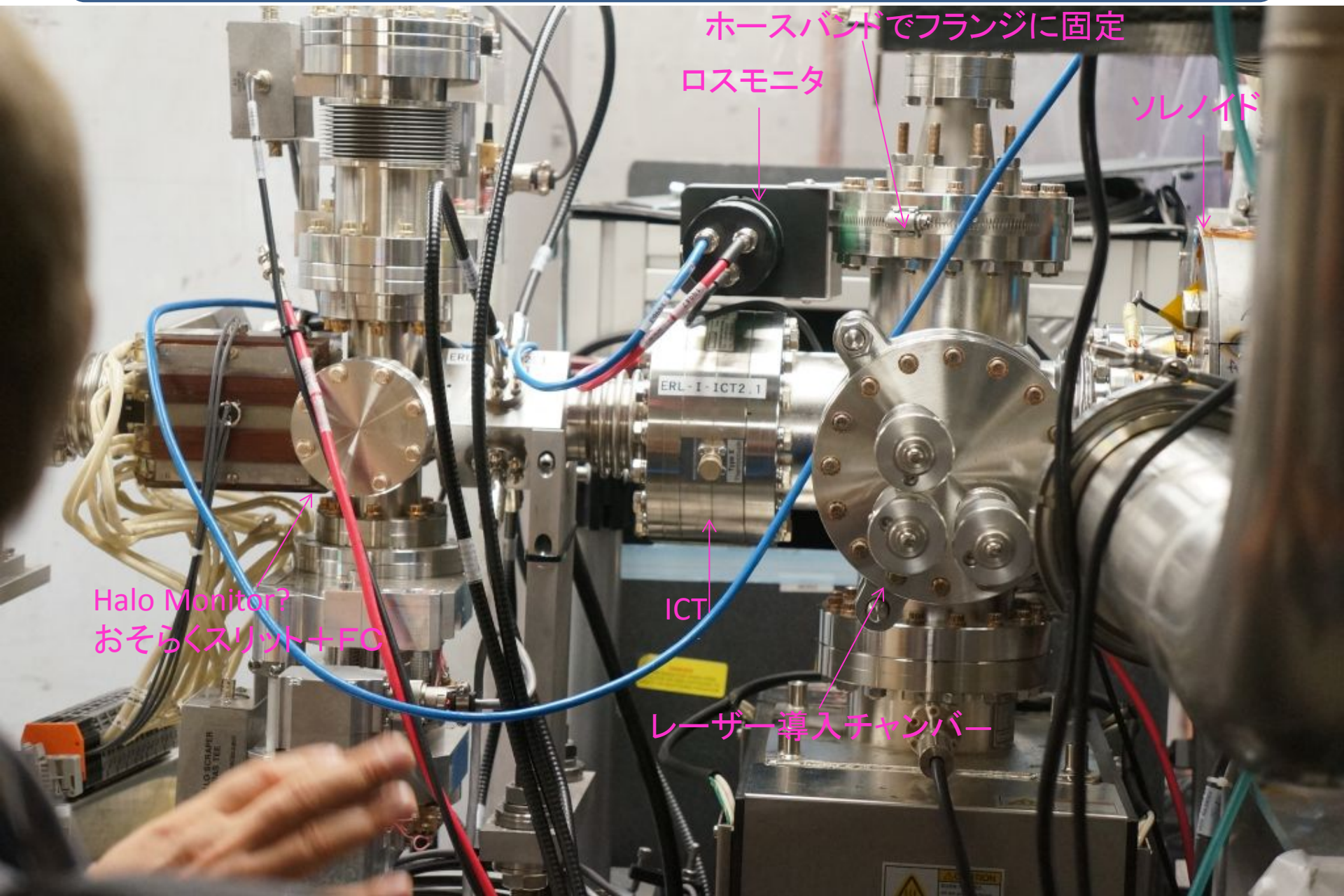
Gun Valve-Box

導波管

Input Coupler

直線導入

SRF Gun 直後 (Gunは右側)



ホースバンドでフランジに固定

ロスモニタ

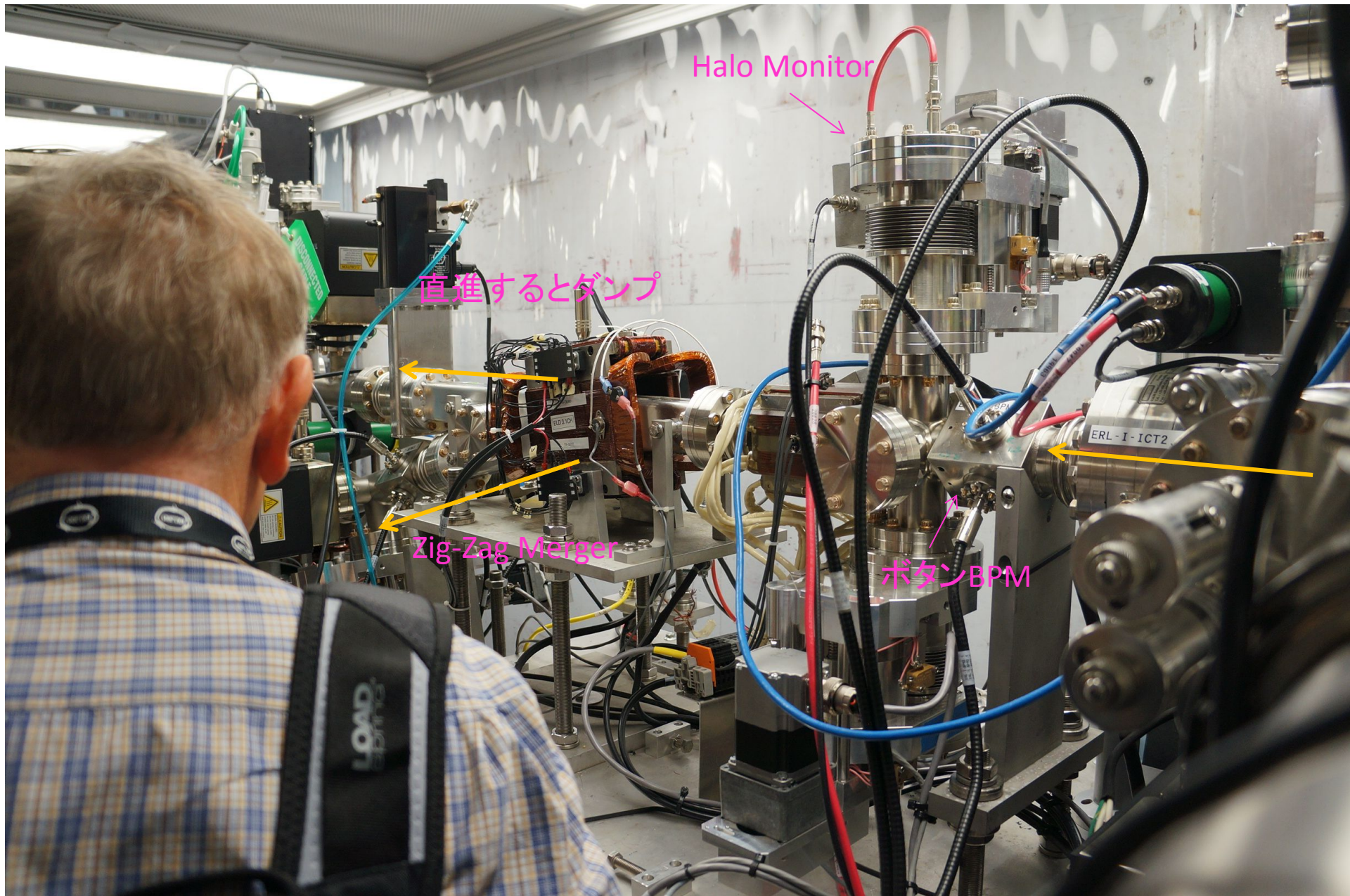
ソレノイド

Halo Monitor?
おそらくスリット+FC

ICT

レーザー導入チャンバー

そこから少し下流側を眺める



Halo Monitor

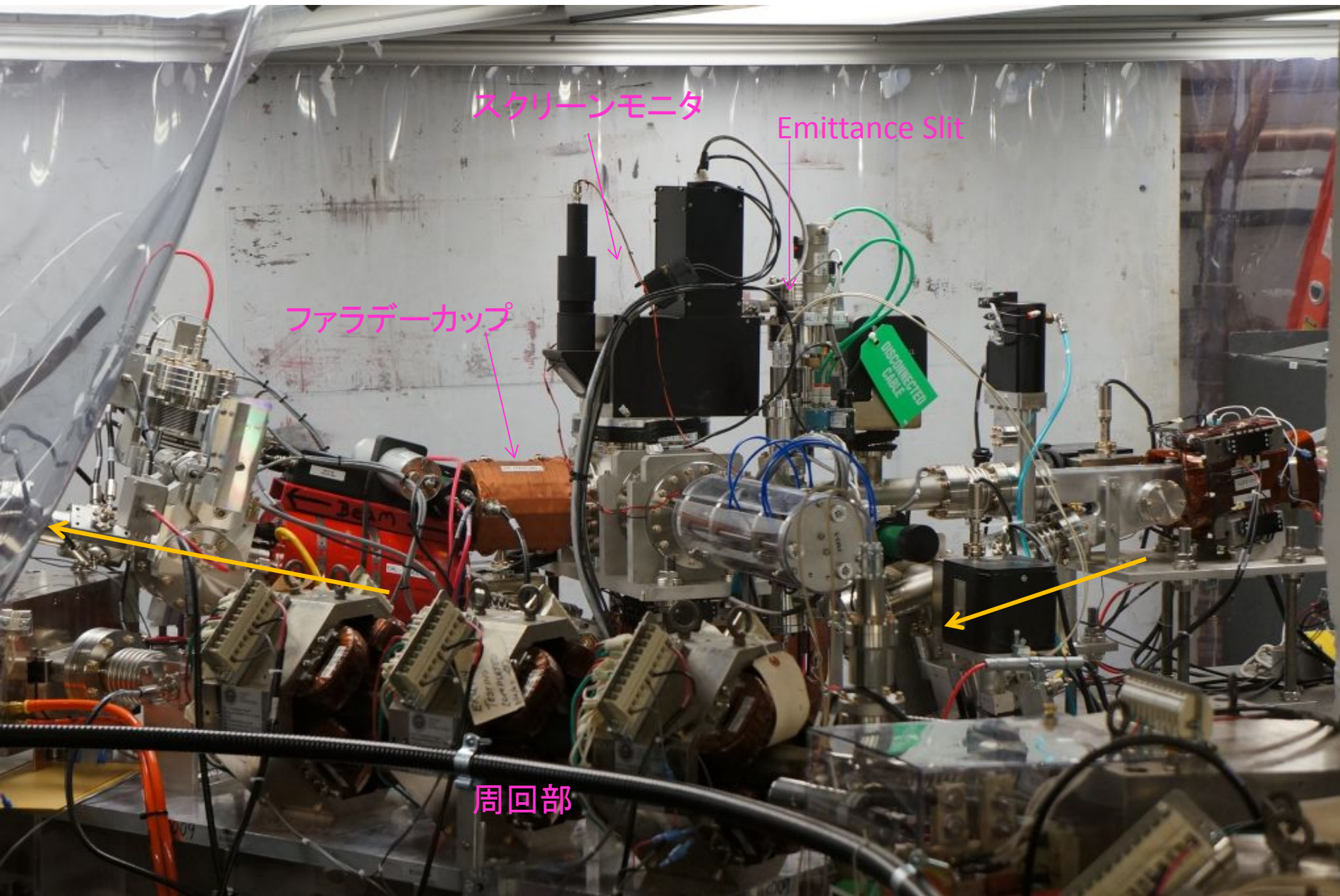
直進するとダンプ

Zig-Zag Merger

ボタンBPM

ERL-I-ICT2

周回部側から入射部を眺める



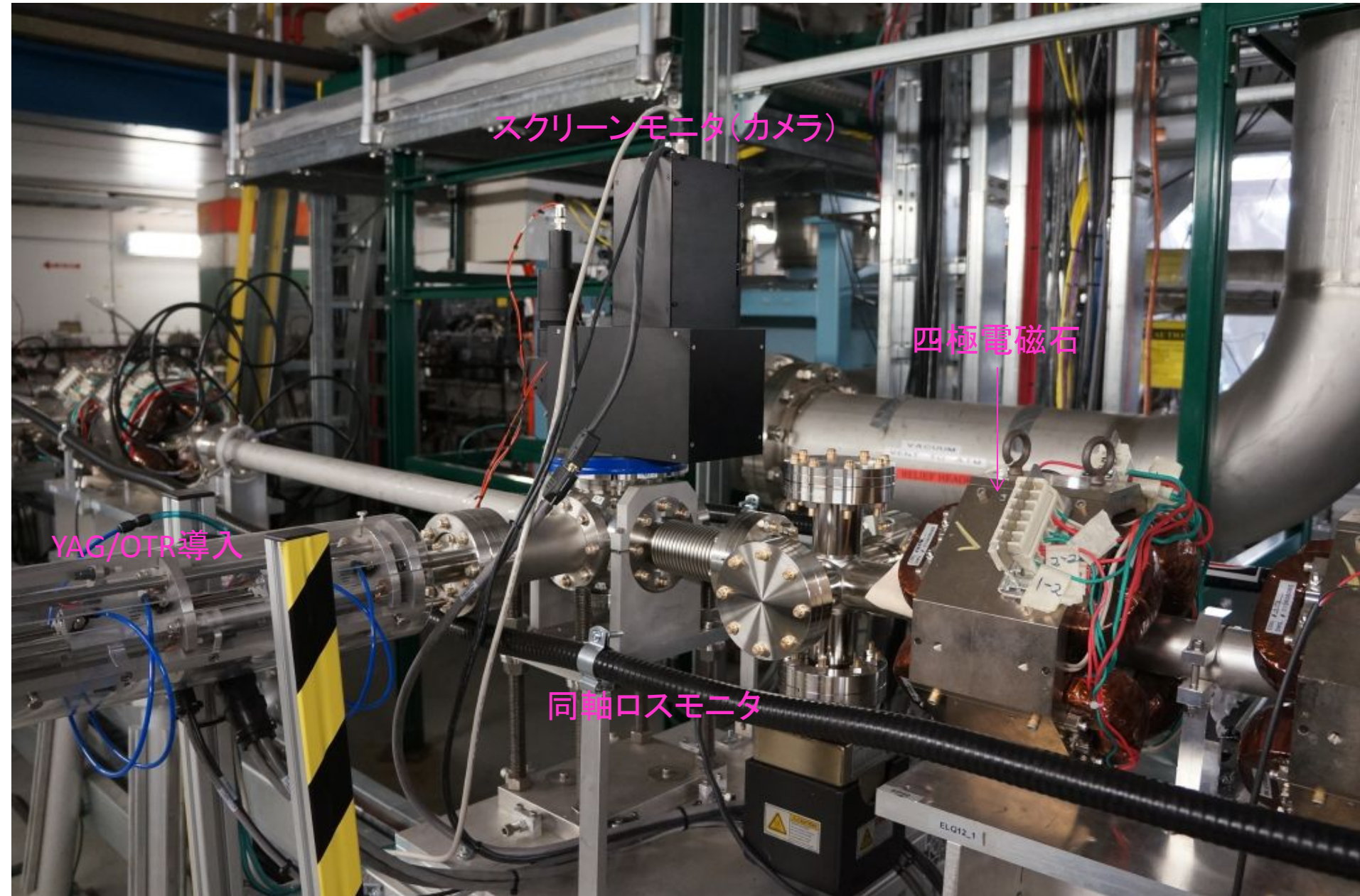
周回部のスクリーンモニタ

スクリーンモニタ(カメラ)

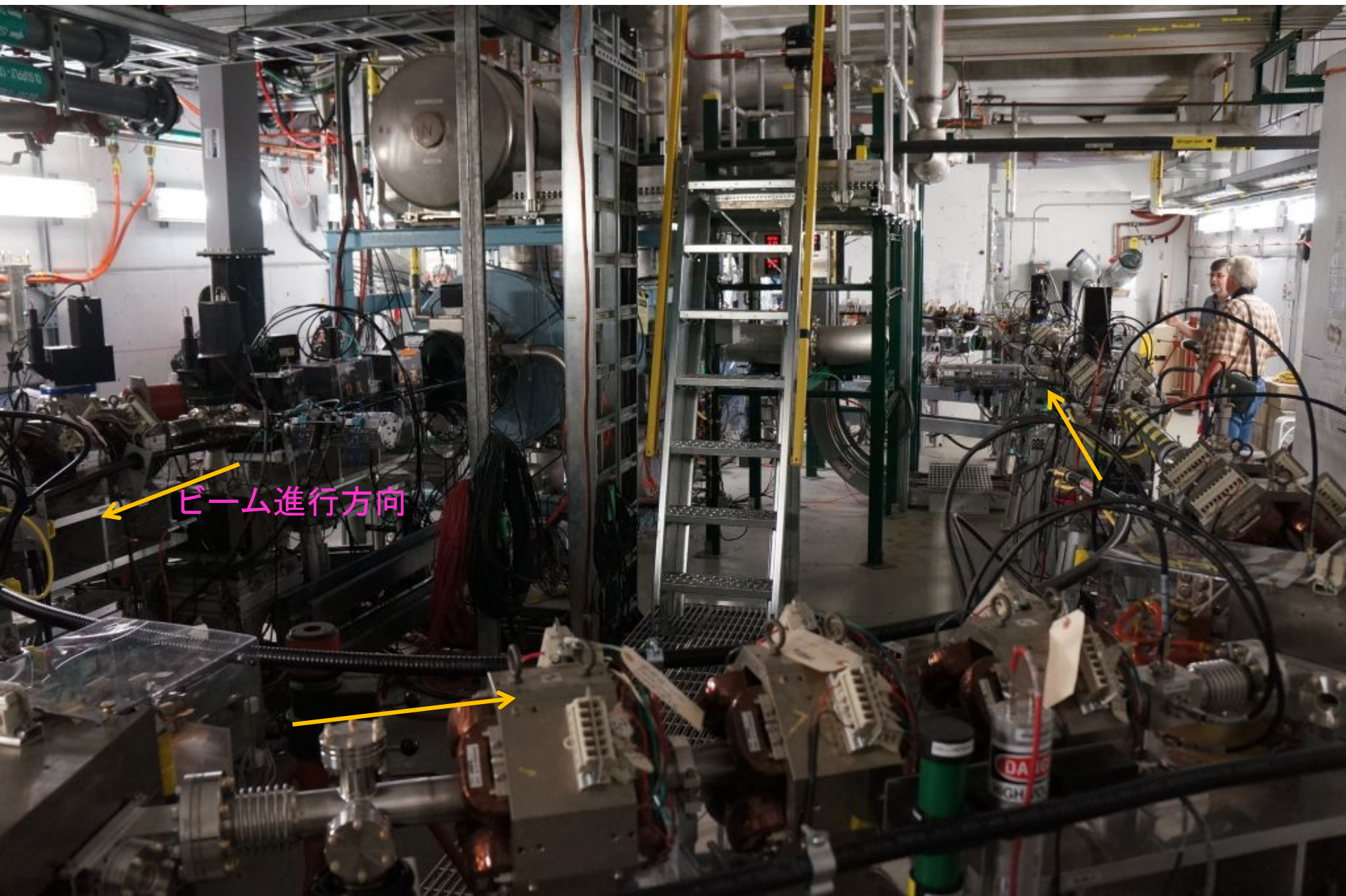
四極電磁石

YAG/OTR導入

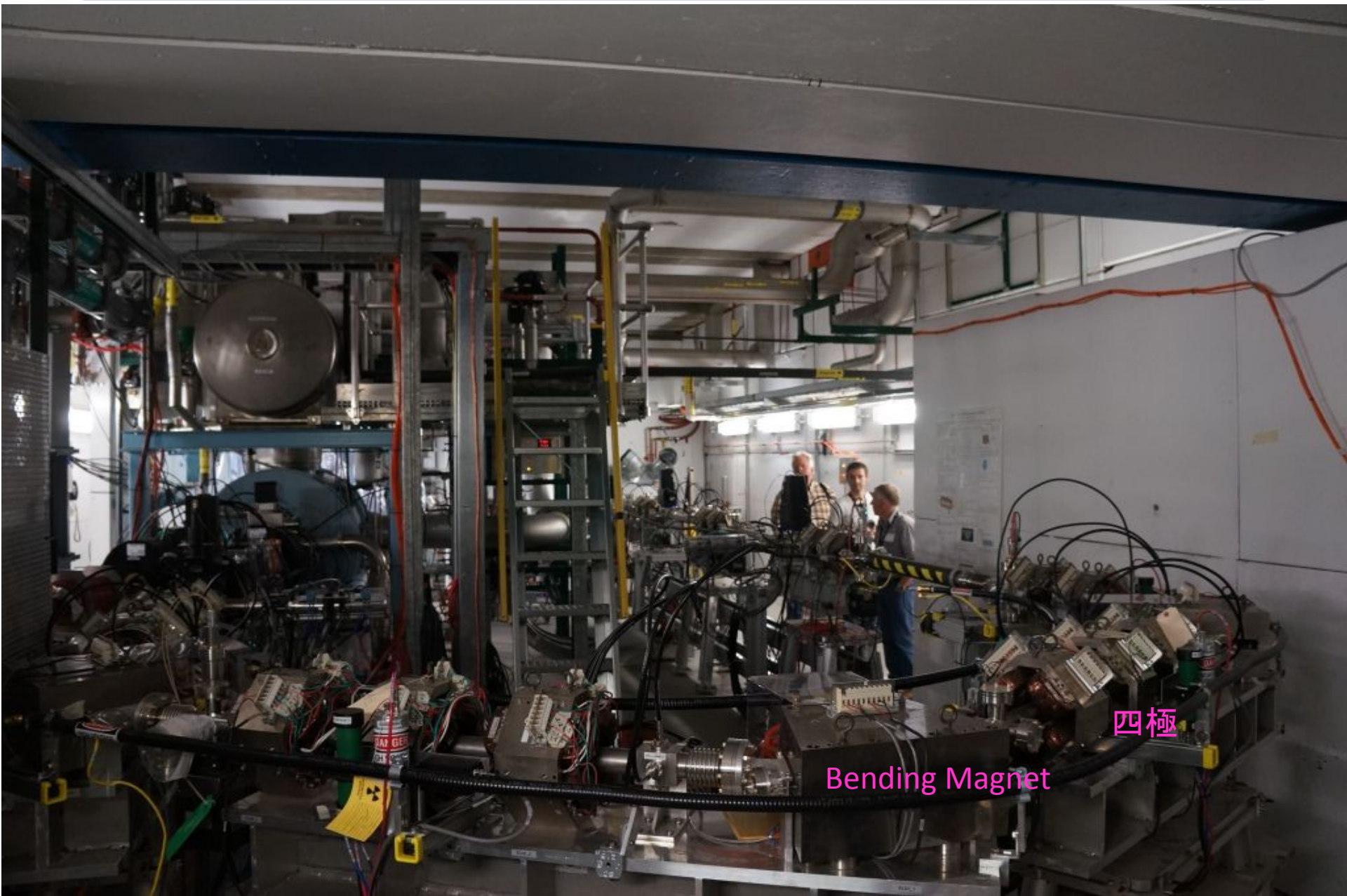
同軸ロスモニタ



第1 アーク側から周回部を見る



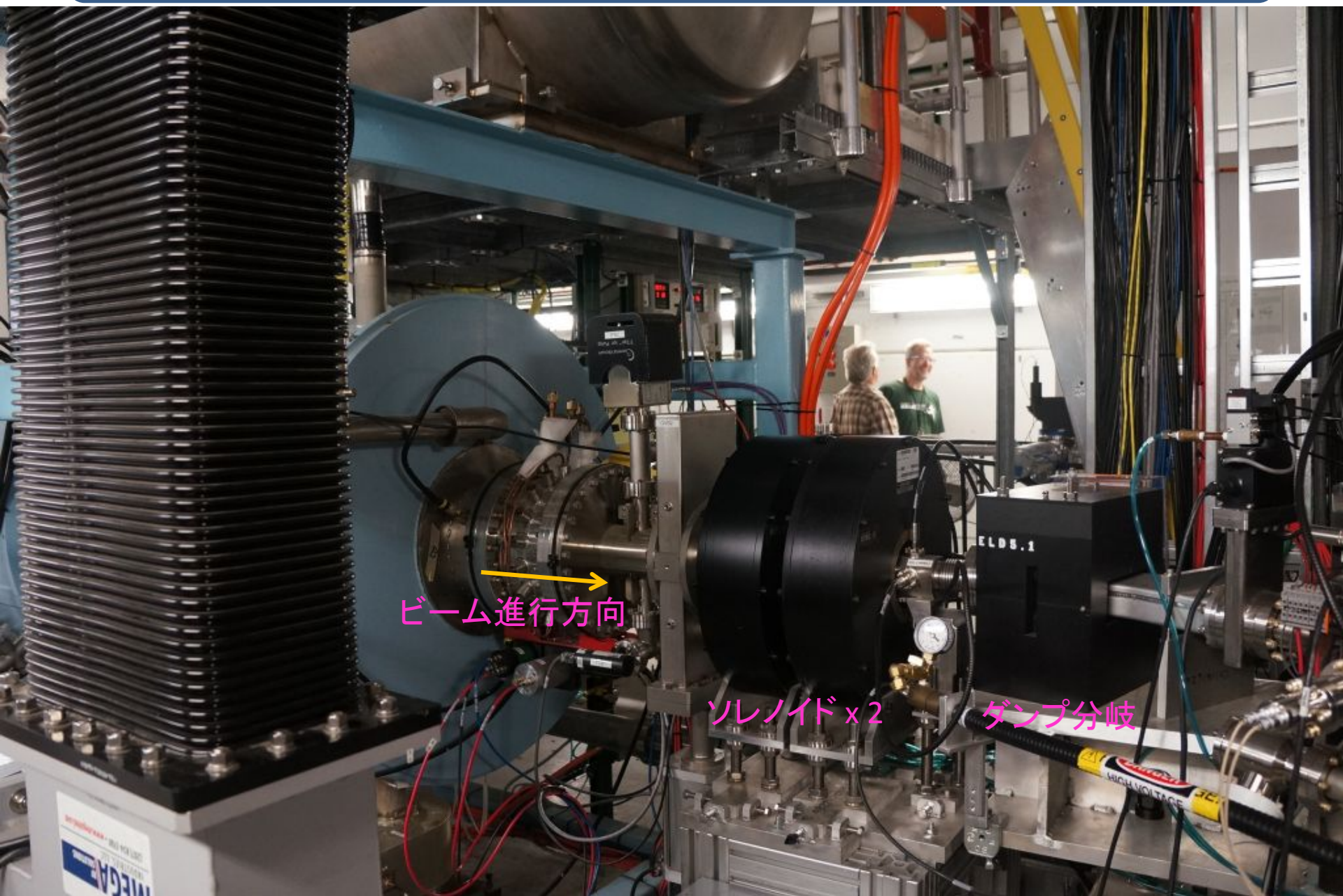
少し角度を変えて主空洞側から



四極

Bending Magnet

主空洞下流

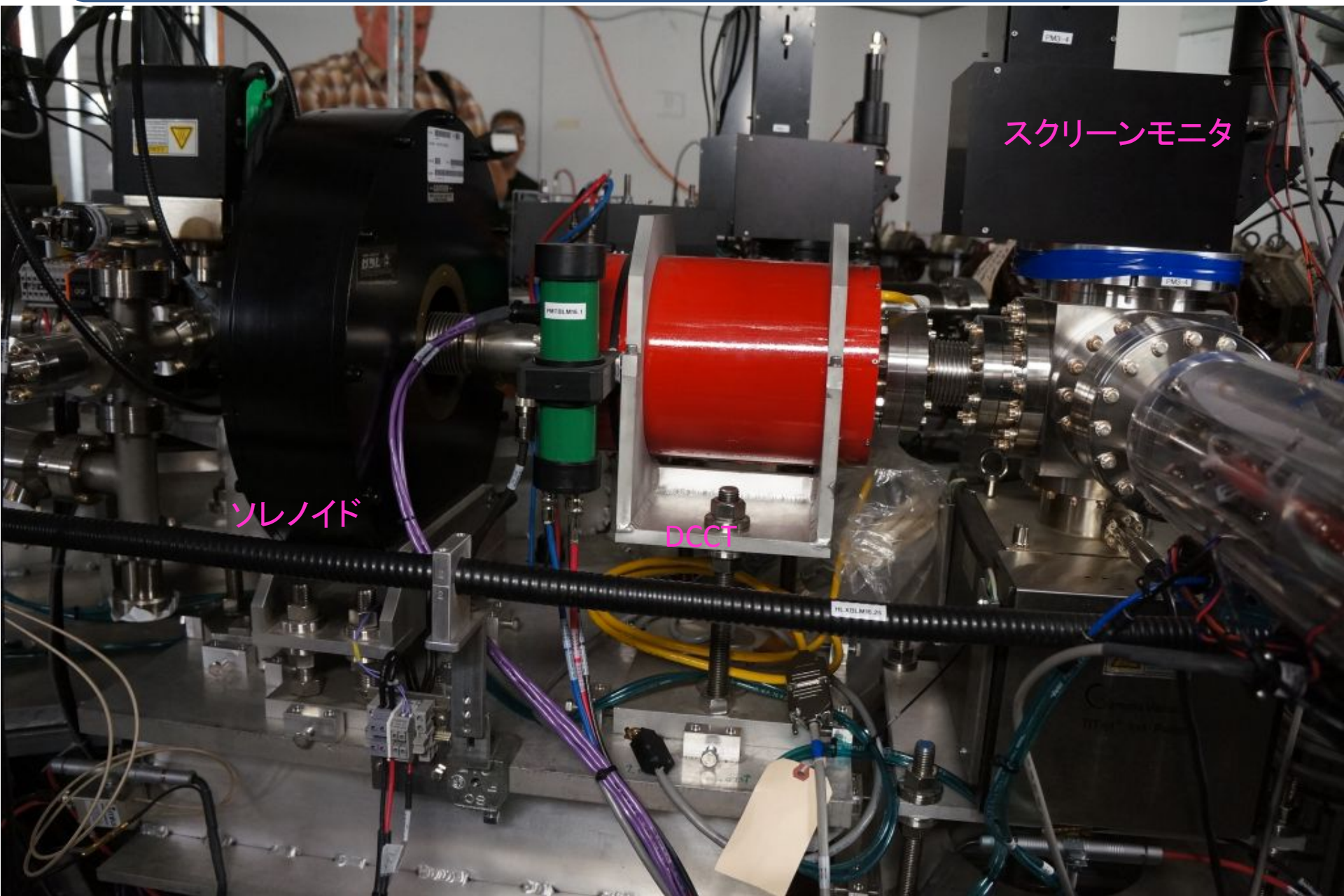


ビーム進行方向

ソレノイド×2

ダンプ分岐

ダンプ分岐～ダンプまで

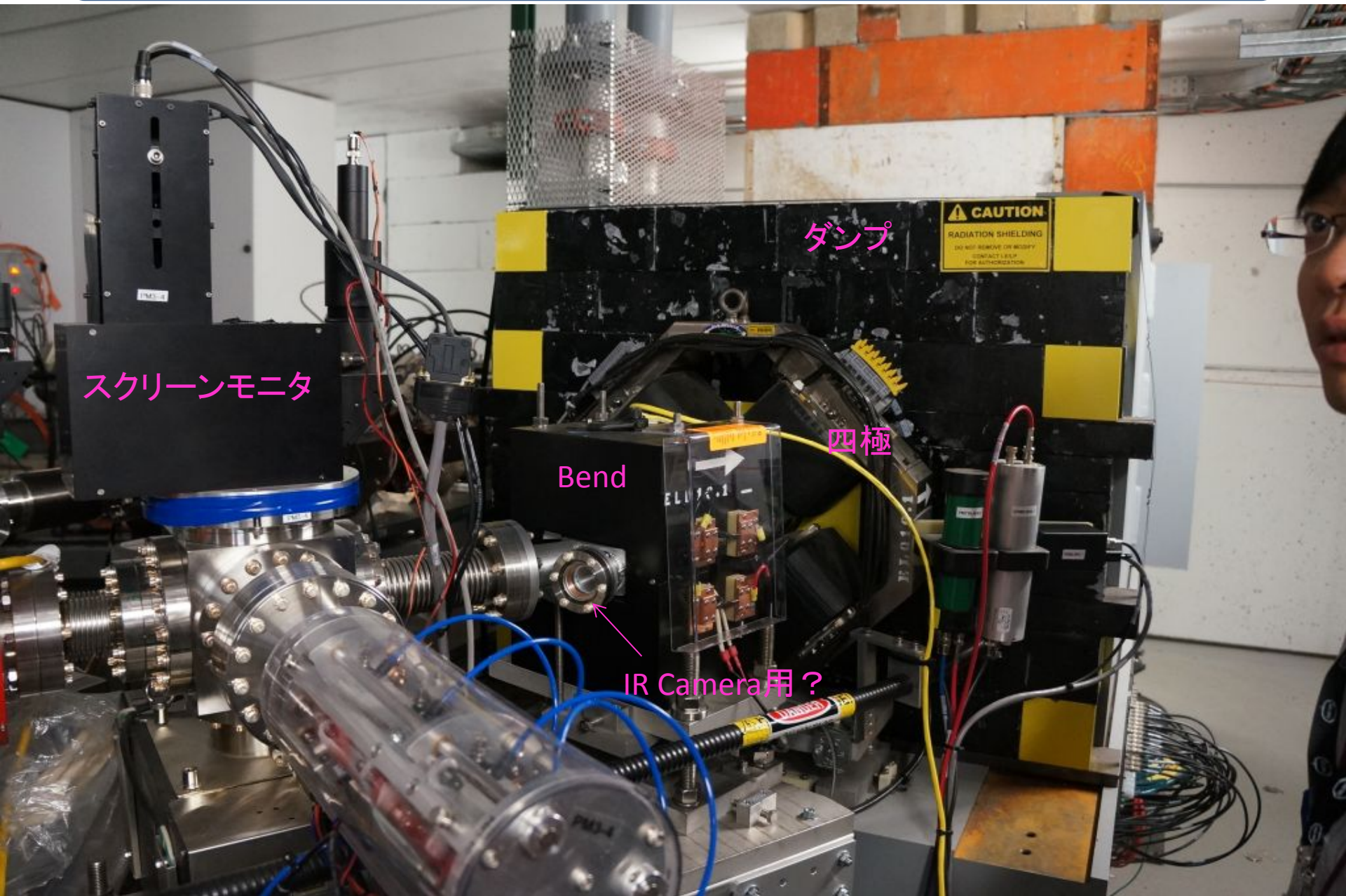


ソレノイド

DCCT

スクリーンモニタ

主ダンプ



スクリーンモニタ

Bend

IR Camera用?

四極

ダンプ

CAUTION
RADIATION SHIELDING
DO NOT REMOVE OR MODIFY
CONTACT HELP
FOR AUTHORIZATION

2MW Klystron HV



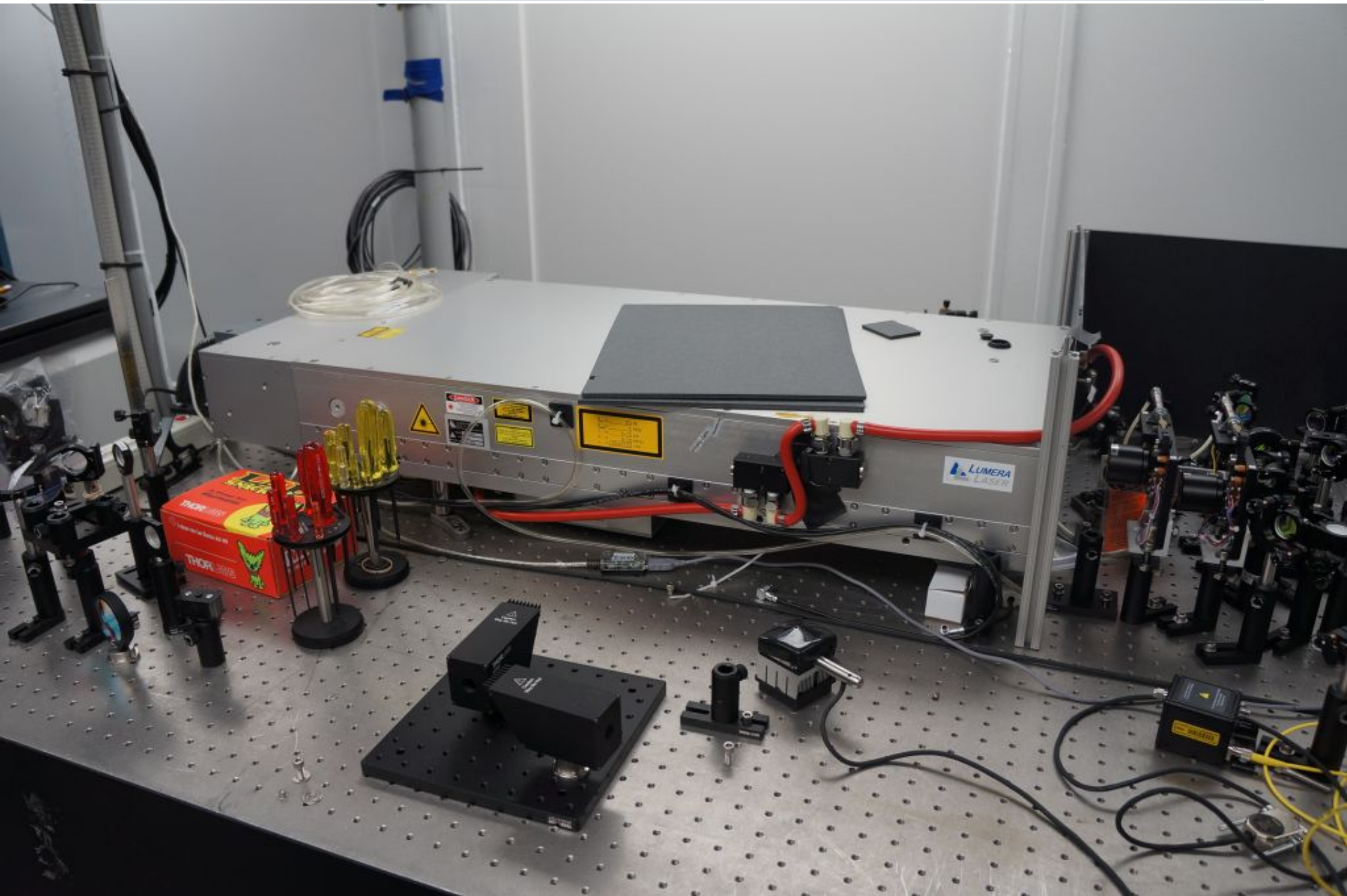
クライストロン（横置き）



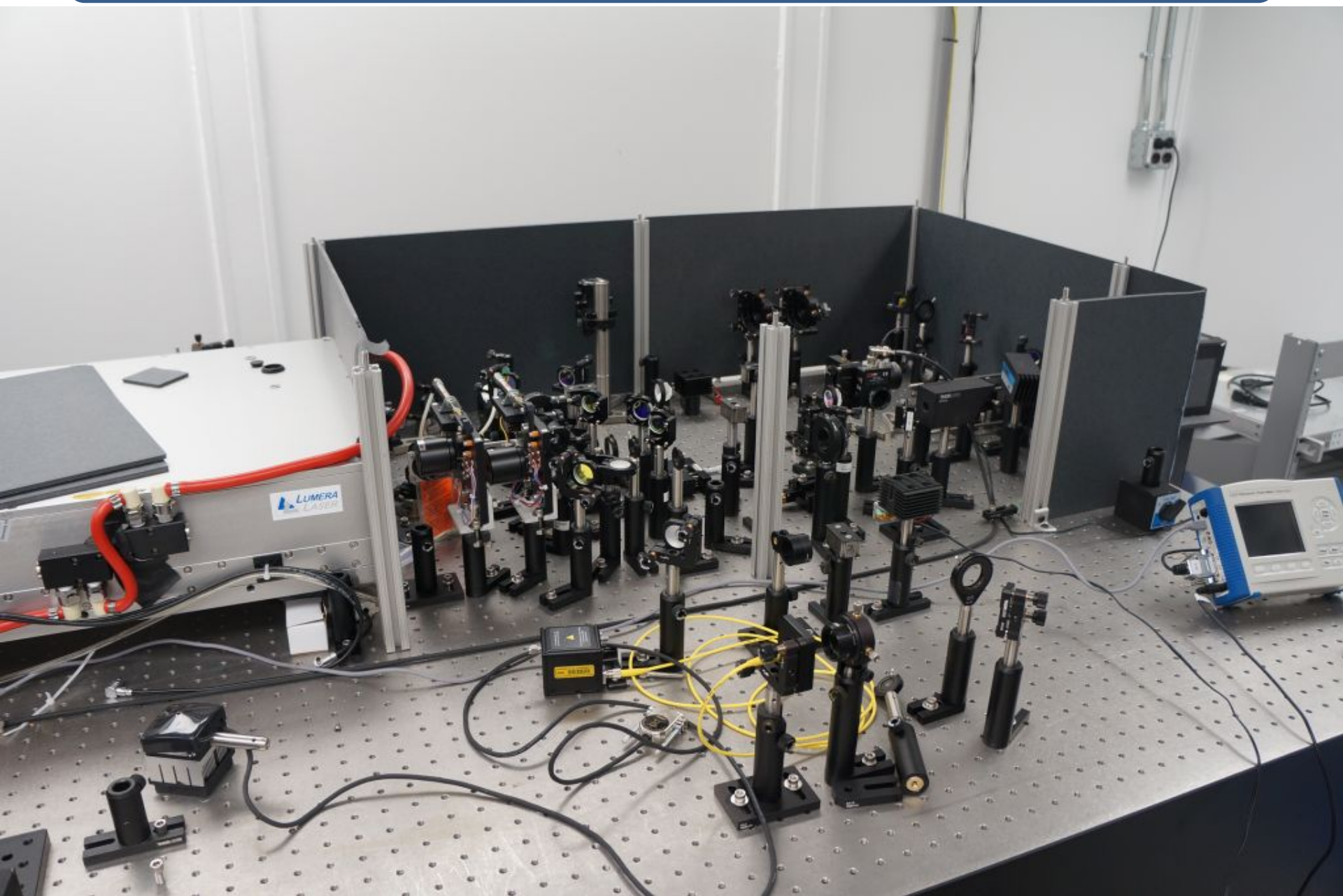
レーザー室の入口



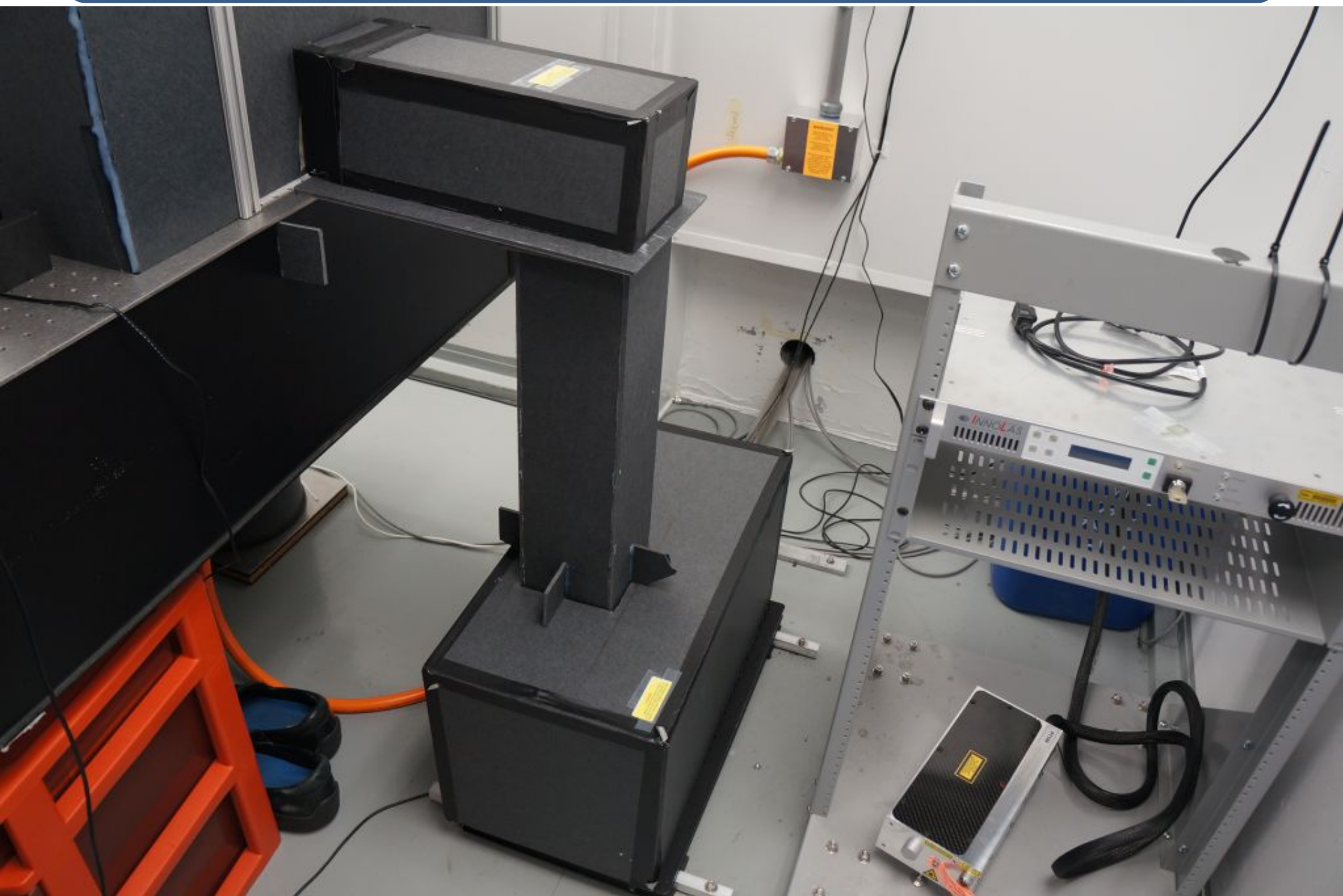
レーザー（市販品）



光学テーブル



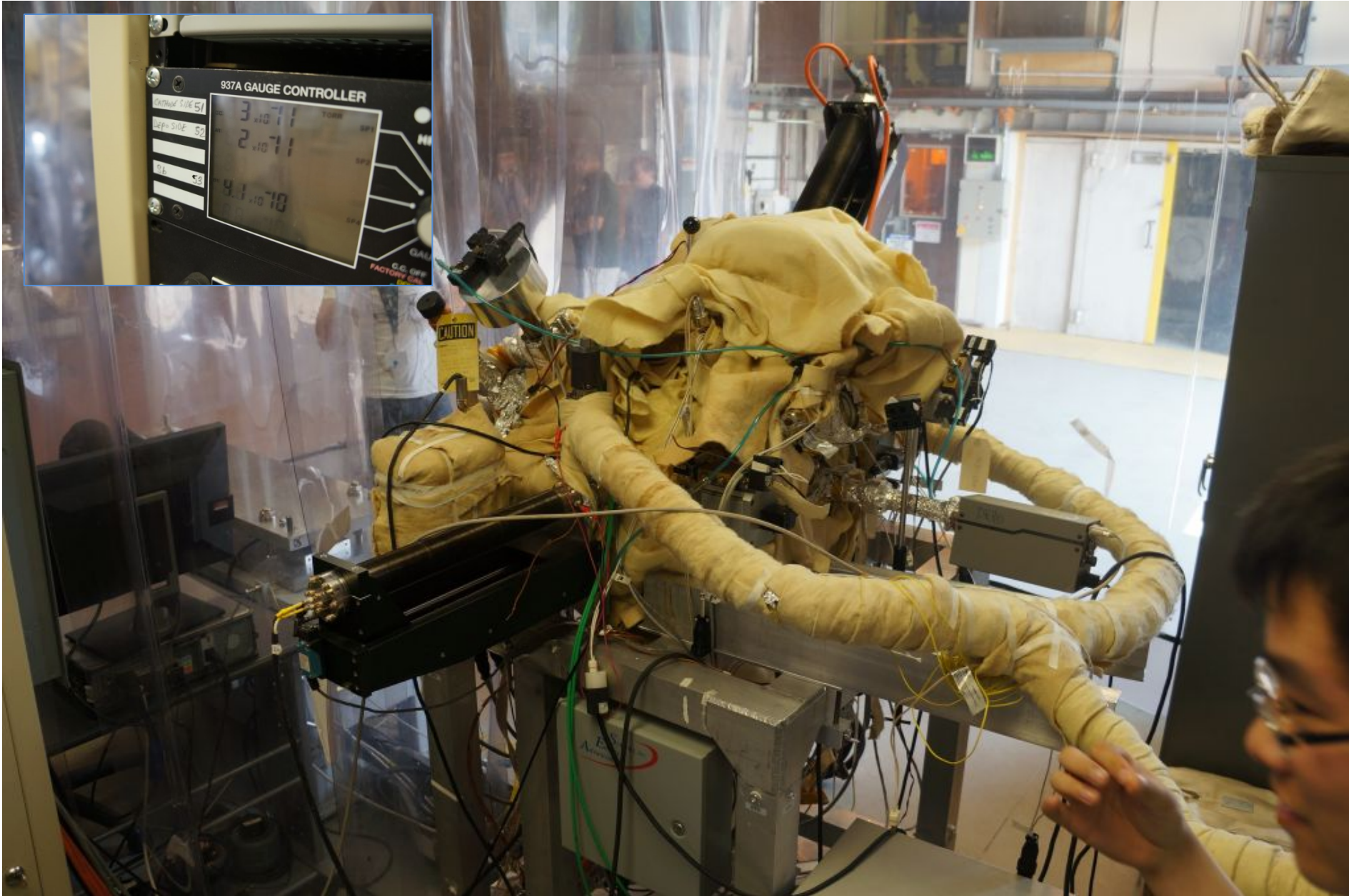
加速器室への輸送路



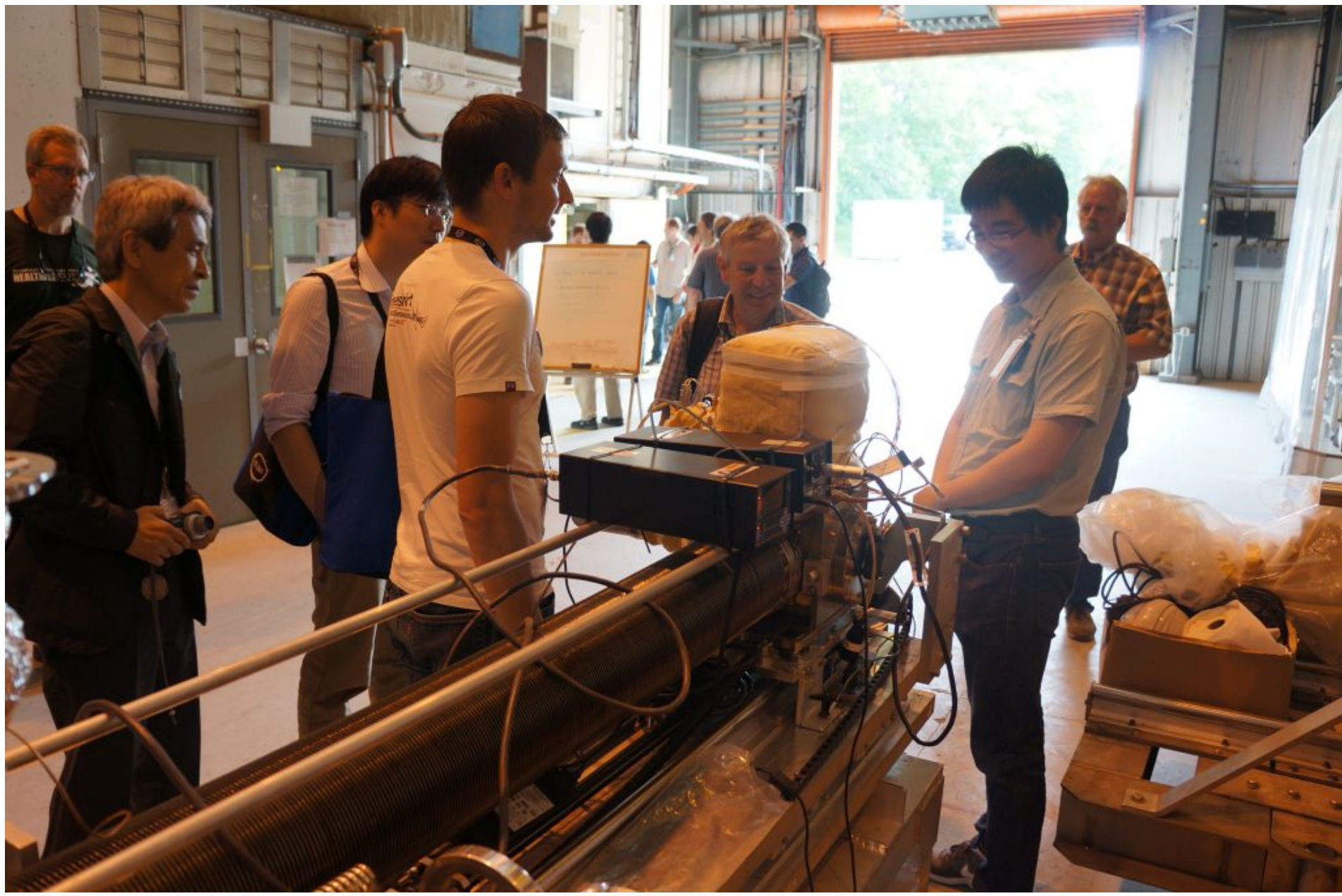
カソード開発



カソード準備中



Transfer Rod



SRF Facility

SUPERCONDUCTING RF FACILITY AT COLLIDER-ACCELERATOR DEPARTMENT

The SRF infrastructure in building 912 allows us to work with various SRF cavities from 56 MHz to 1300 MHz:

- clean preparation of the cavities for vertical tests
- baking the cavities in a 800°C vacuum oven
- performance testing in vertical dewars in large and small Vertical Test Facilities (LVTF and SVTF)
- dedicated ERL/VTF refrigeration system provides cryogenics



BNL/AES facility at AES for SRF cavity processing: BCP, HPR, clean room



- 300 W 4 K refrigerator.
- A liquid ring pump is used to reach 2 K operation, capable of handling a 100 W heat load.
- 5000 gallon LHe storage dewar.
- 30,000 gallon warm helium gas storage tank.



右側が縦測定エリア。奥にクリーンルーム等



Small Vertical Test Facility

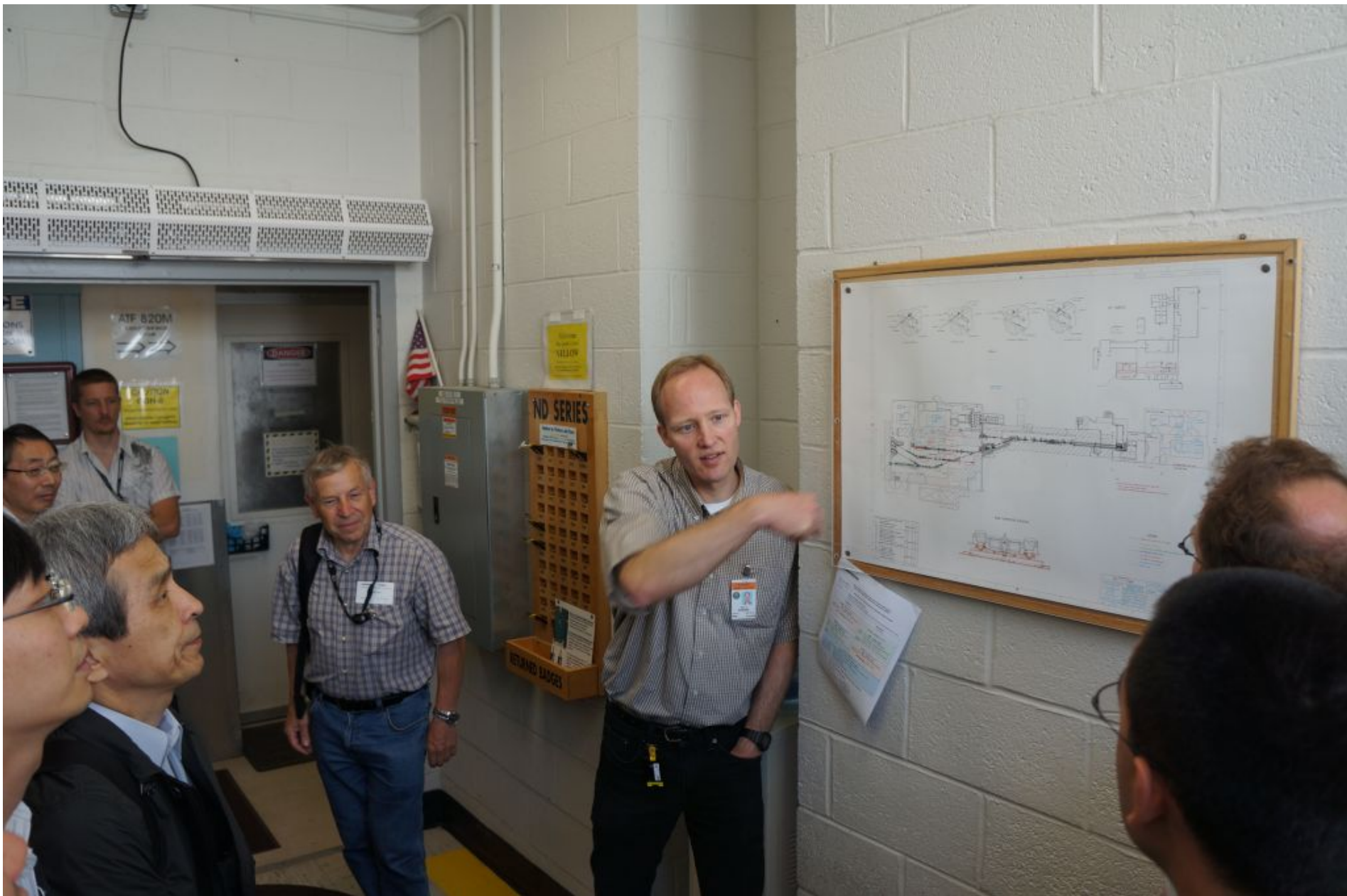


ATF見学

- 80 MeV, sub-picosecond, 3 kA electron beam
- 1 TW IR(10 μ m) CO2 レーザー



入口で説明



コントロール室



スリットの写真

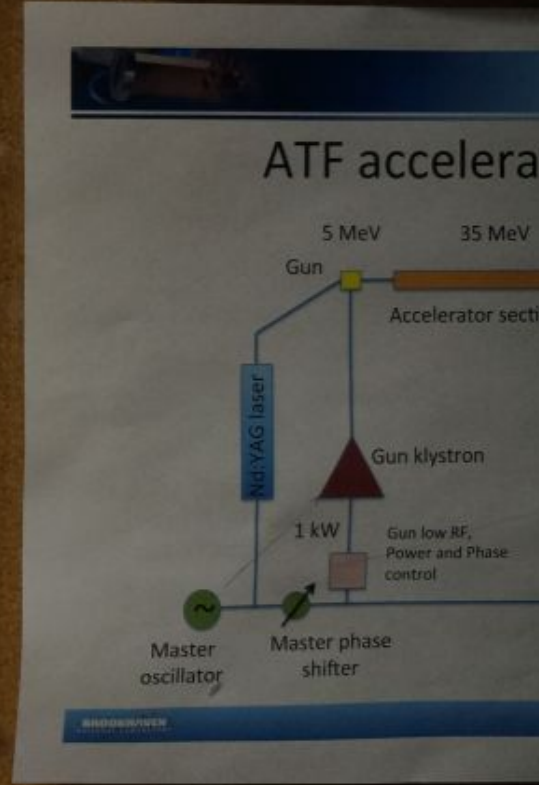


Visit ATF website:
While here you will be able to get more information and learn how to submit your research proposals

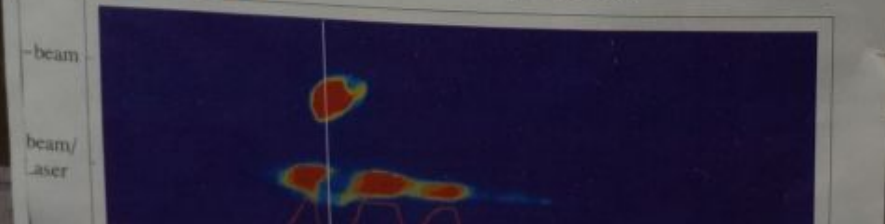
- Accelerator beam physics
- Particle science and beam instrumentation
- Novel acceleration methods
- Novel radiation sources

Research carried out at the ATF is critical to the advent of X-ray Free Electron Lasers (FEL). This is demonstrated by very high-current electron beams from a photogun, self-amplified spontaneous emission (SASE) operation at visible wavelengths and a novel gain harmonic generation. The developments laid the foundation for the Linac Coherent Light Source.

The U.S. Department of Energy's Brookhaven National Laboratory



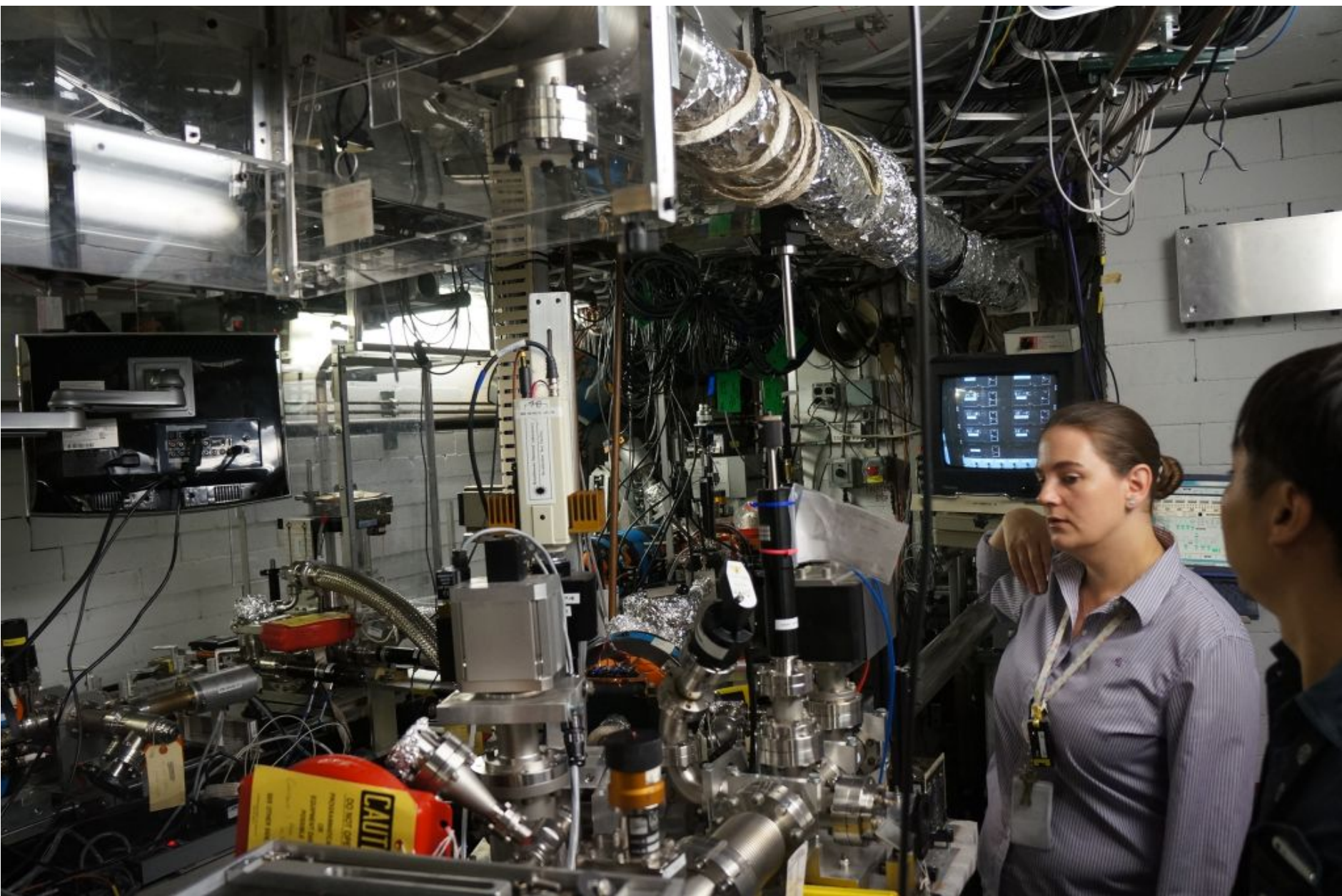
ribicon 2/7/13 Incoming E-Beam = 800 pC @ 52 MeV



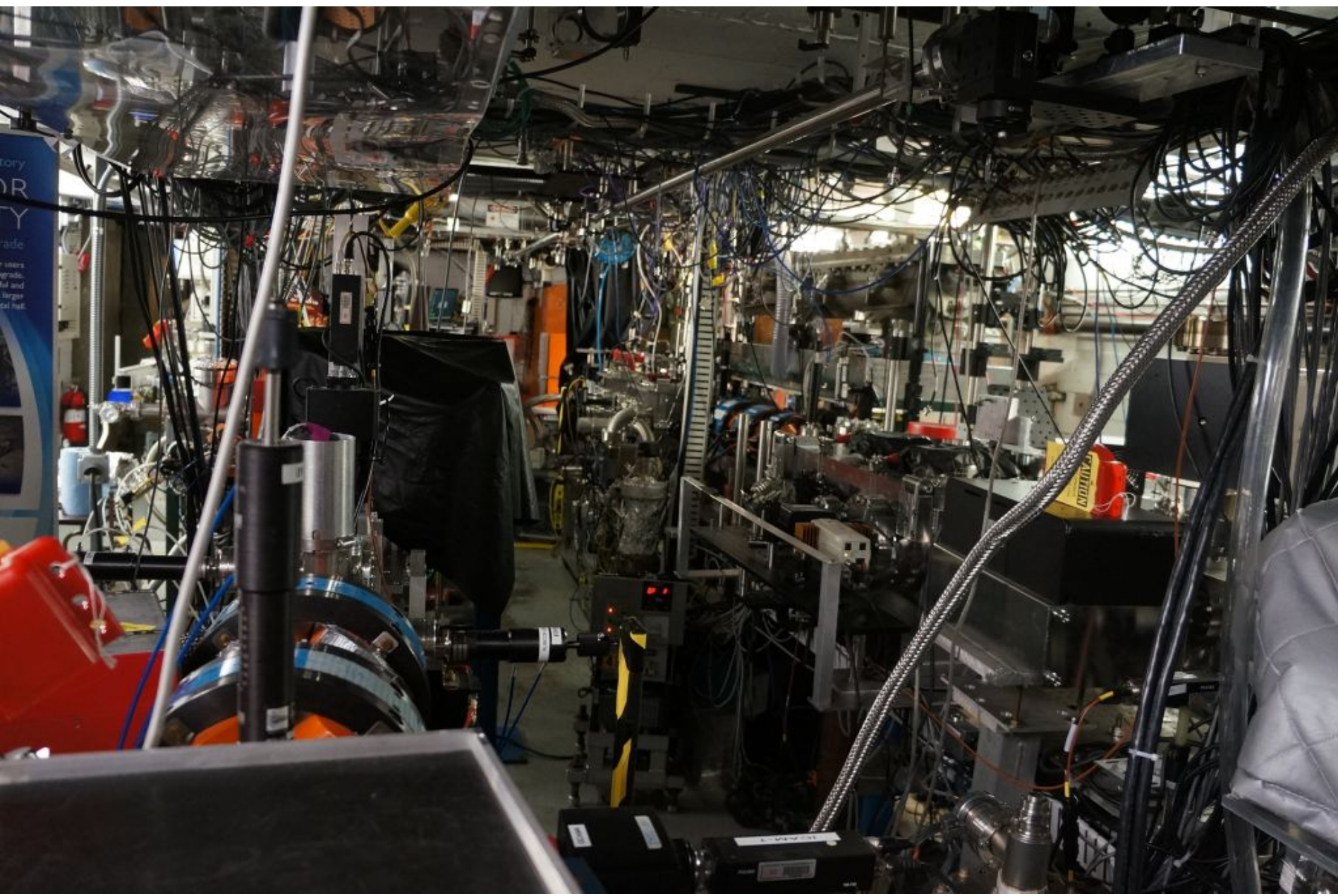
ribicon 02/04/2013

IFEL induced energy modulation

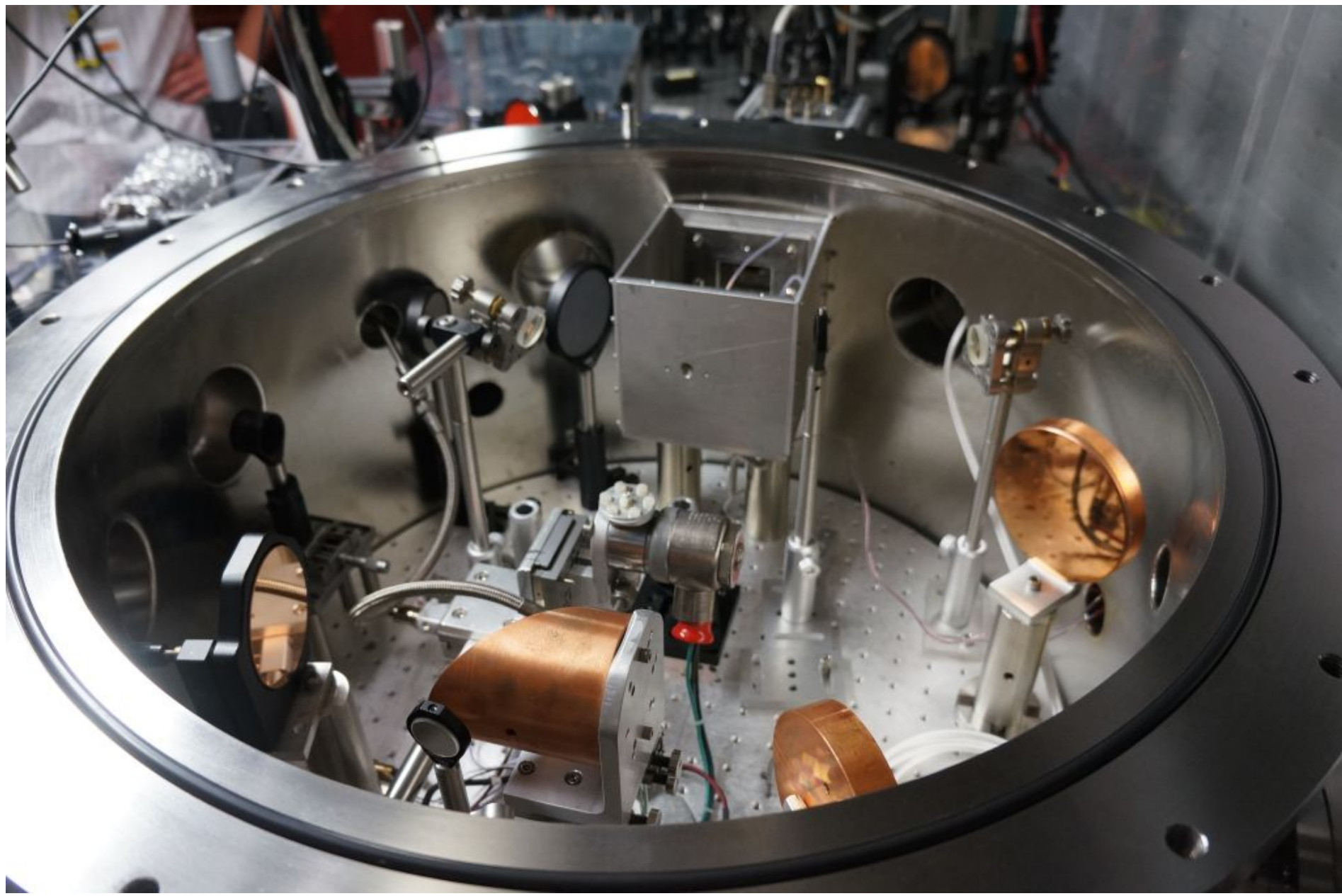
加速器室内：Linac上流側を見る方向



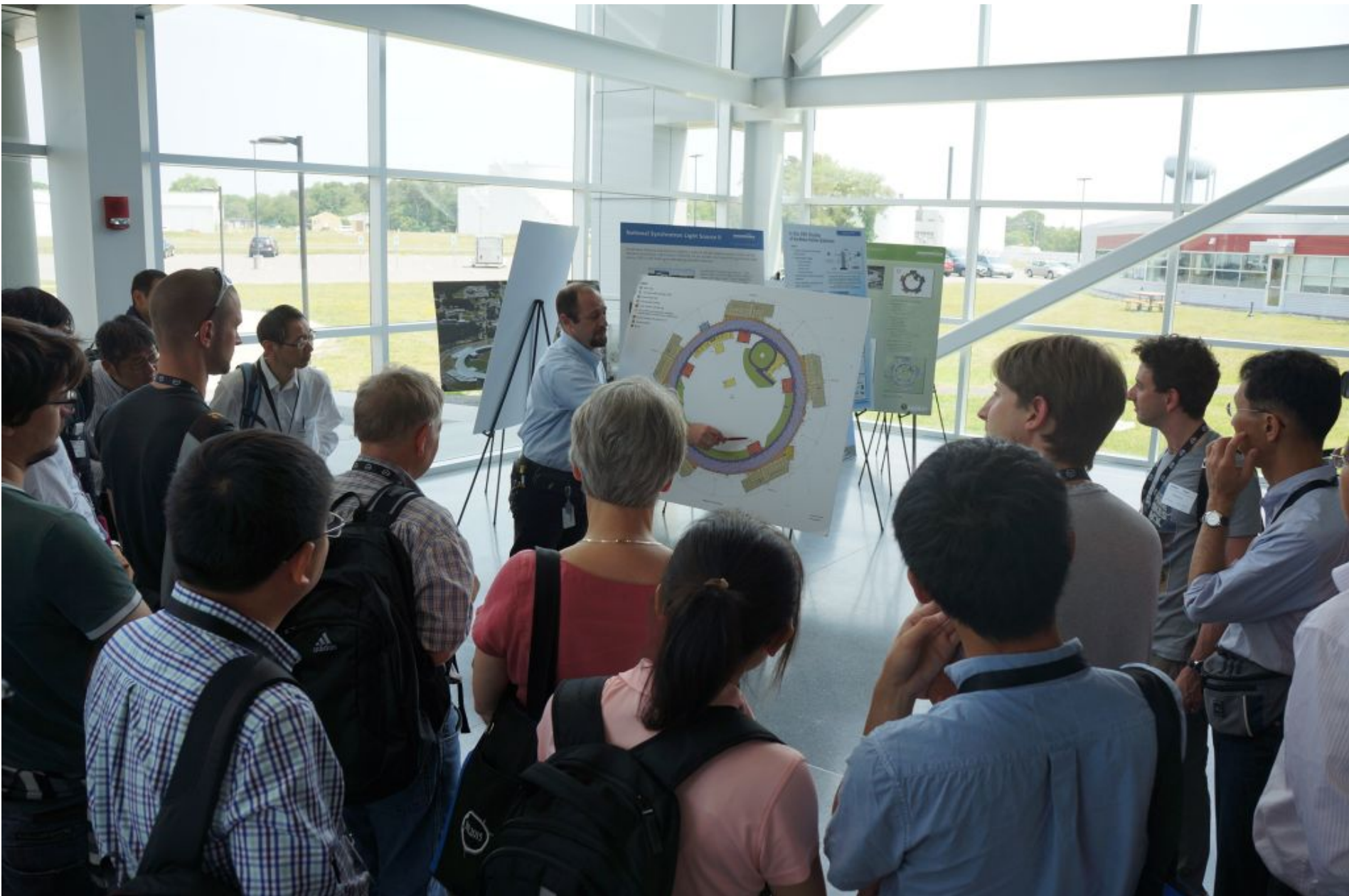
加速器室内：下流側



隣室でやっているレーザープラズマ加速実験



NSLS2見学：入り口付近で説明



定番の展示物



実験ホール：クレーンが無い？



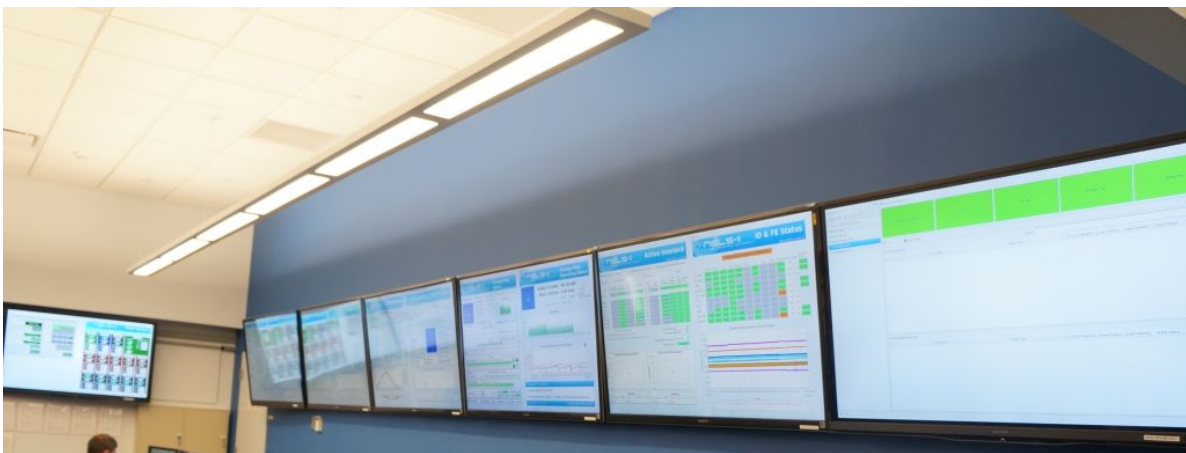
これまた定番の自転車。かご付き三輪車



制御室



見慣れたCSSパネル



PPS



中央の島はシフトリーダーの席



外から見るとこんな感じ



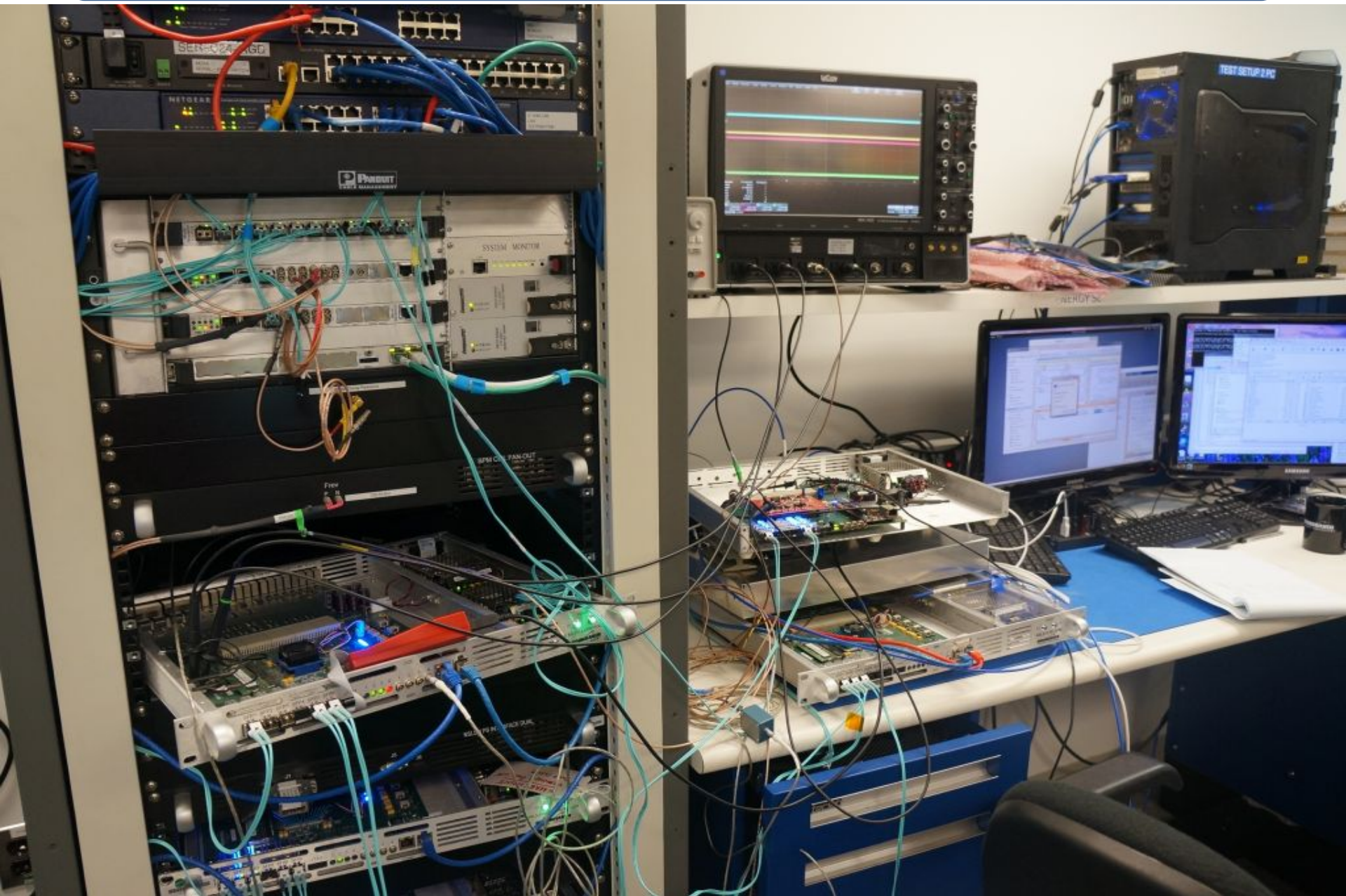
Sam Krinsky 追悼



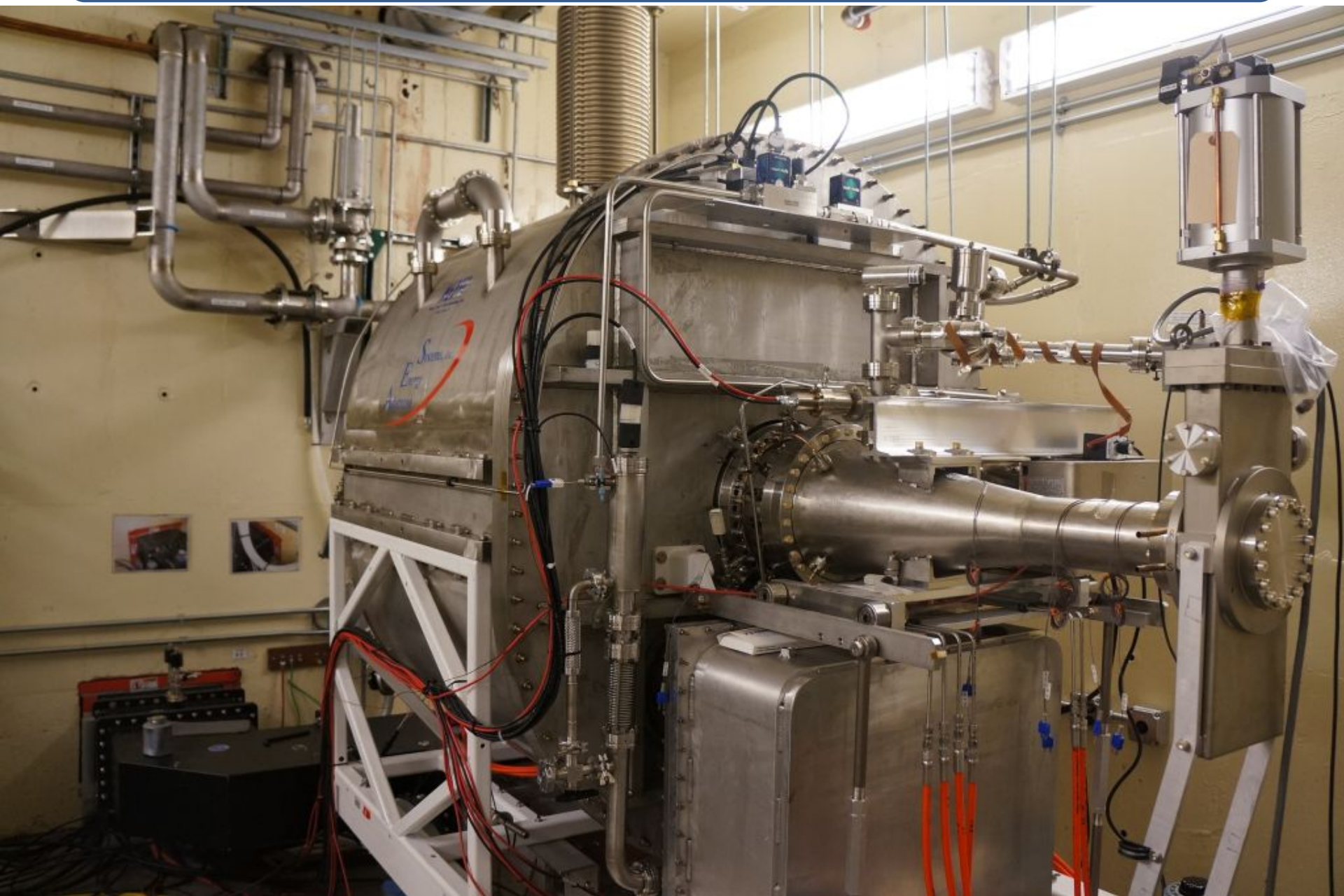
BPM回路：研究所で開発



開発室の様子



超伝導空洞：2台目準備中



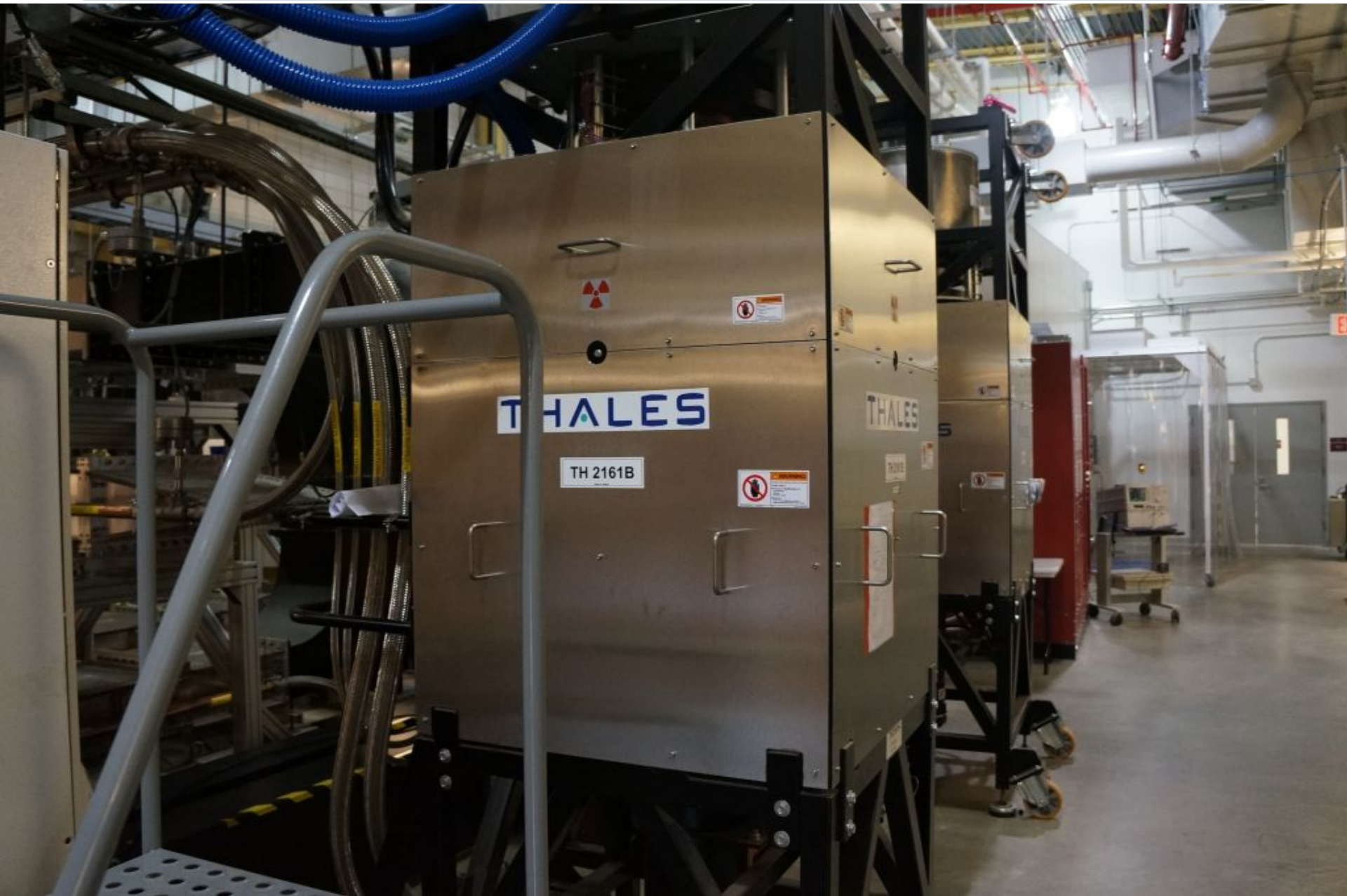
LLRF : やはり自己開発



クライストロン電源：THOMSON



クライストロン：THALES



導波管

クライストロン



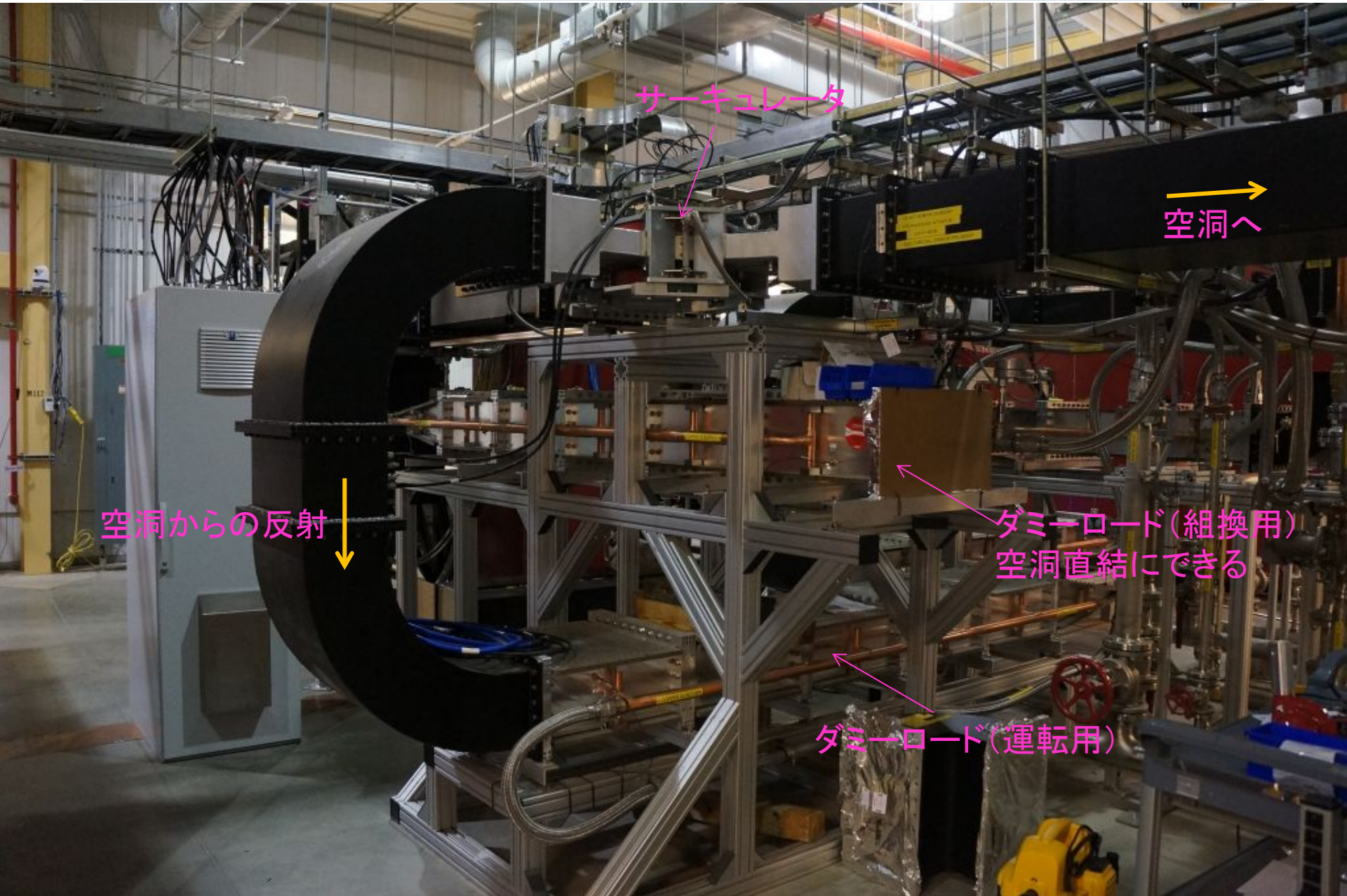
サーキュレータ



ダミーロード



反対側からみる



サーキュレータ

→
空洞へ

↓
空洞からの反射

←
ダミーロード(組換用)
空洞直結にできる

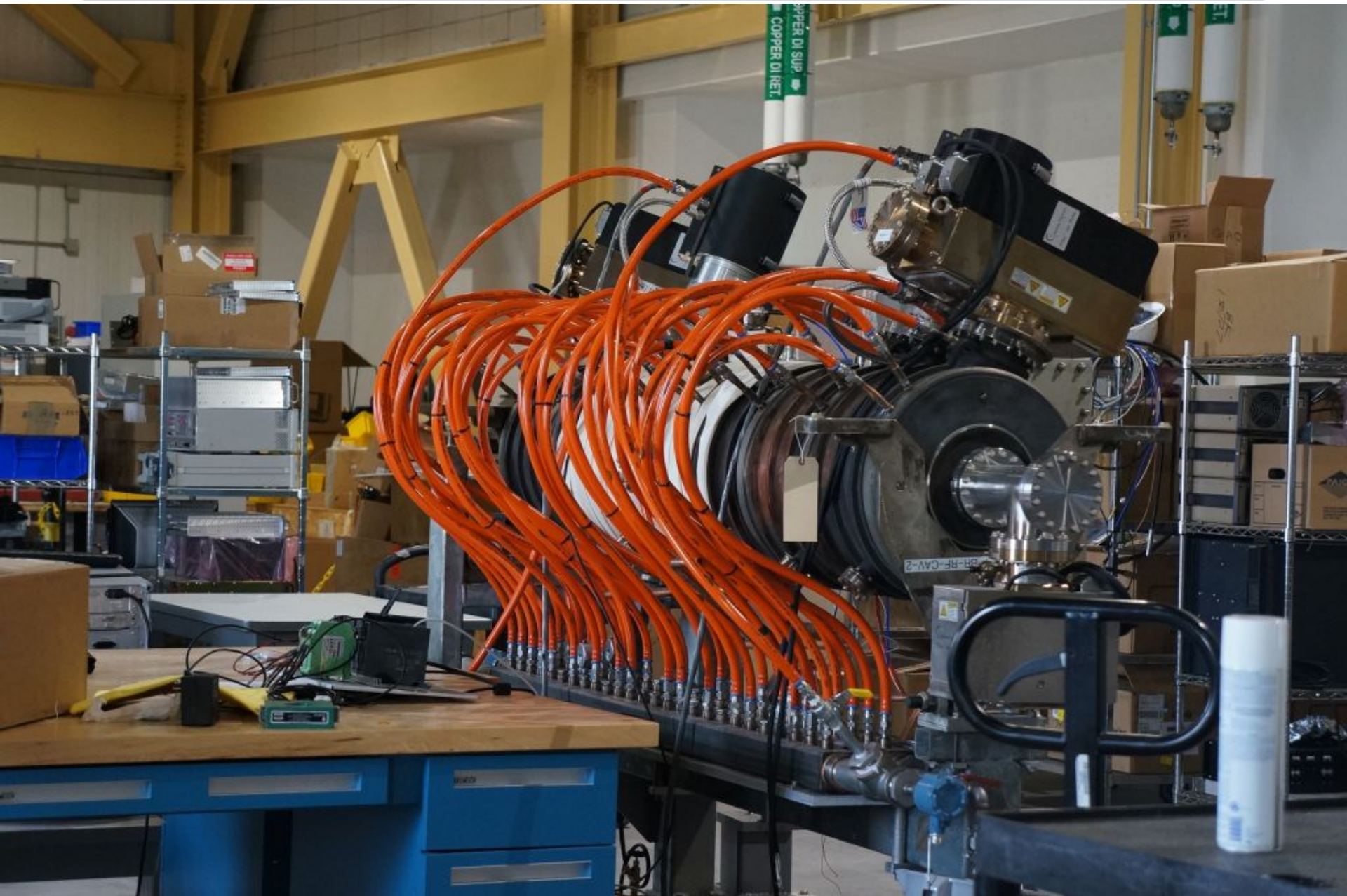
←
ダミーロード(運転用)

クリーンルームと、3倍高調波空洞



色は Yellow Submarine

コミッショニングに使用した常伝導空洞

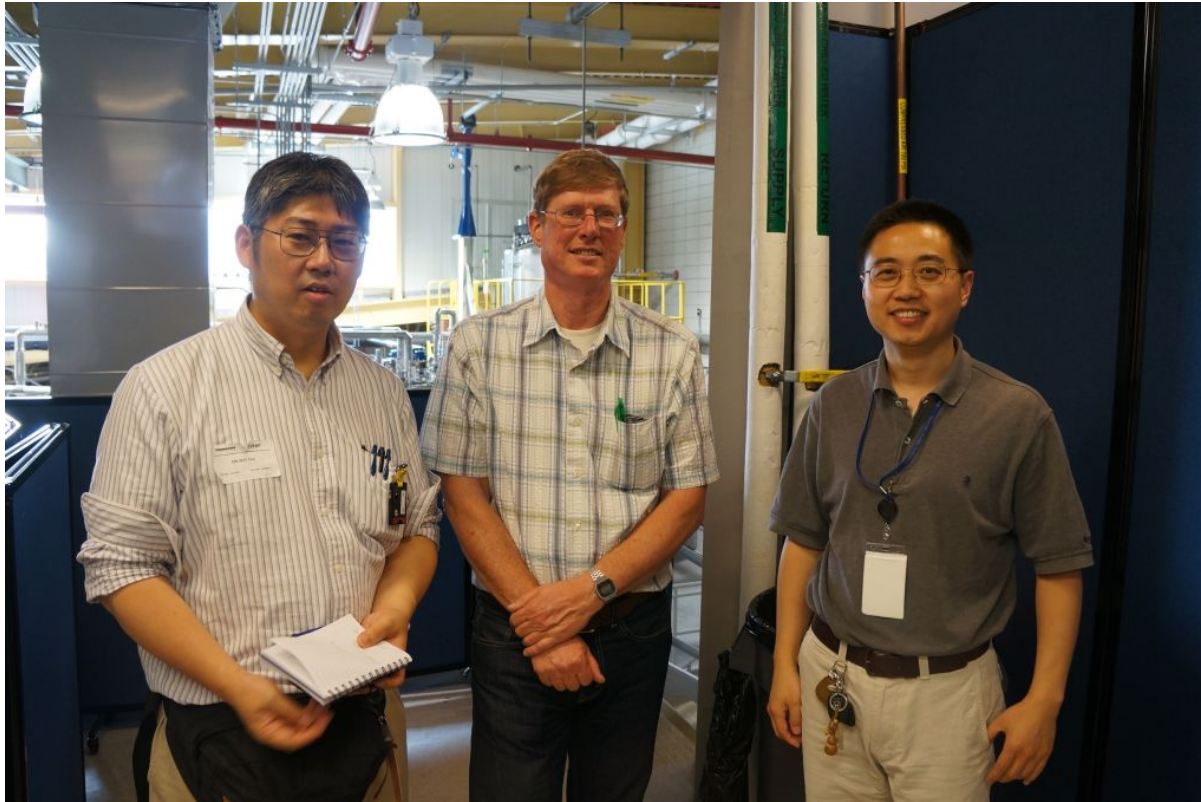


マグネット電源



案内に感謝

- 案内して頂いた Weixing Cheng氏, James Rose 氏に感謝します

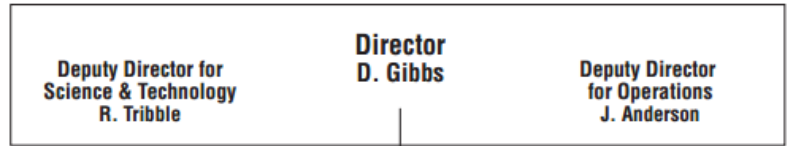


帰国してから調べたBNLの組織図

BROOKHAVEN NATIONAL LABORATORY
Departments, Divisions and Offices

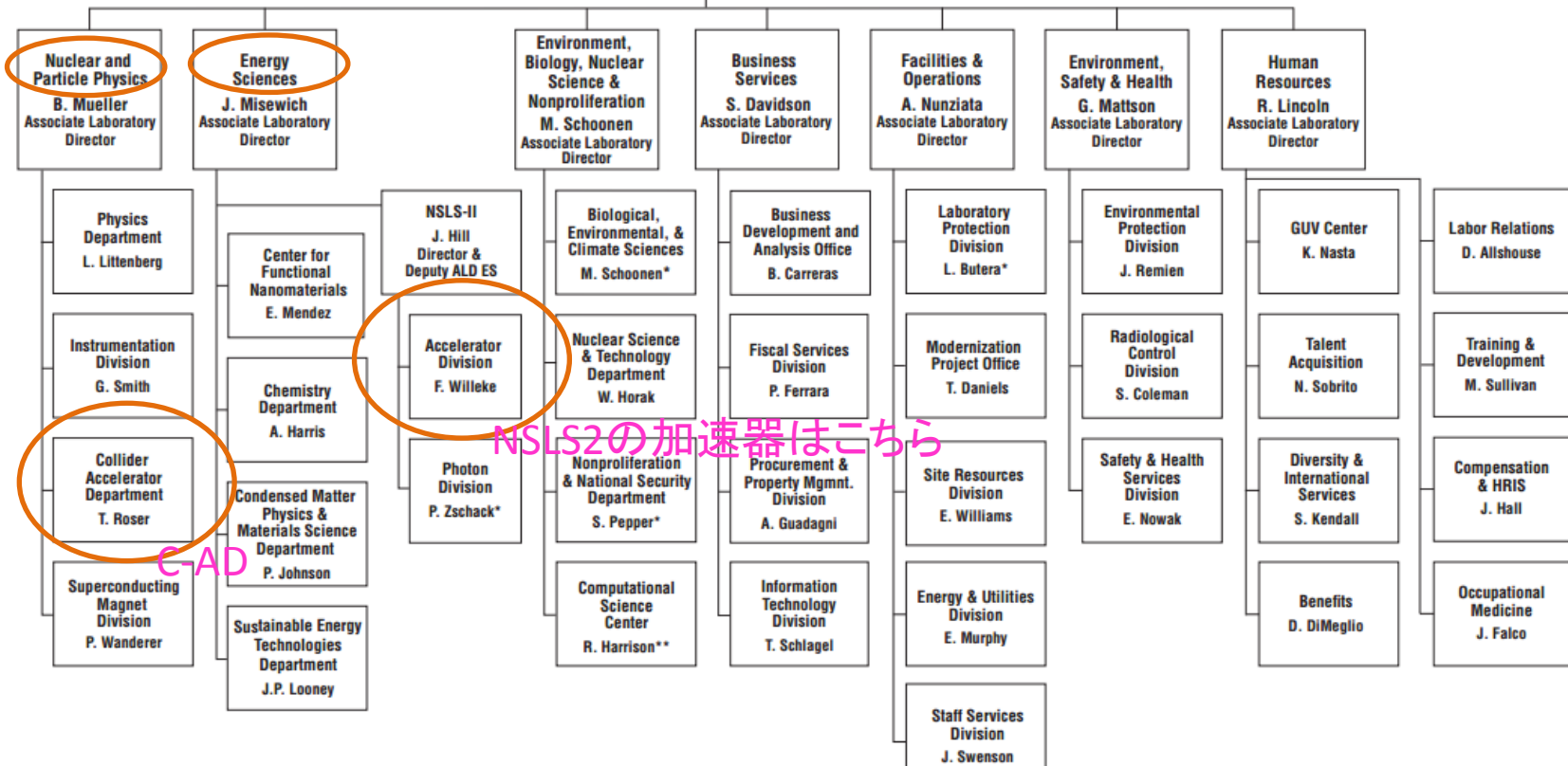
BROOKHAVEN NATIONAL LABORATORY
Operated by
BROOKHAVEN SCIENCE ASSOCIATES
FOR U.S. DEPARTMENT OF ENERGY
CONTRACT NUMBER DE-SC0012704

Approved by Doon Gibbs
MARCH 27, 2015



Staff Offices

Staff Offices



C-ADの組織図...でかい

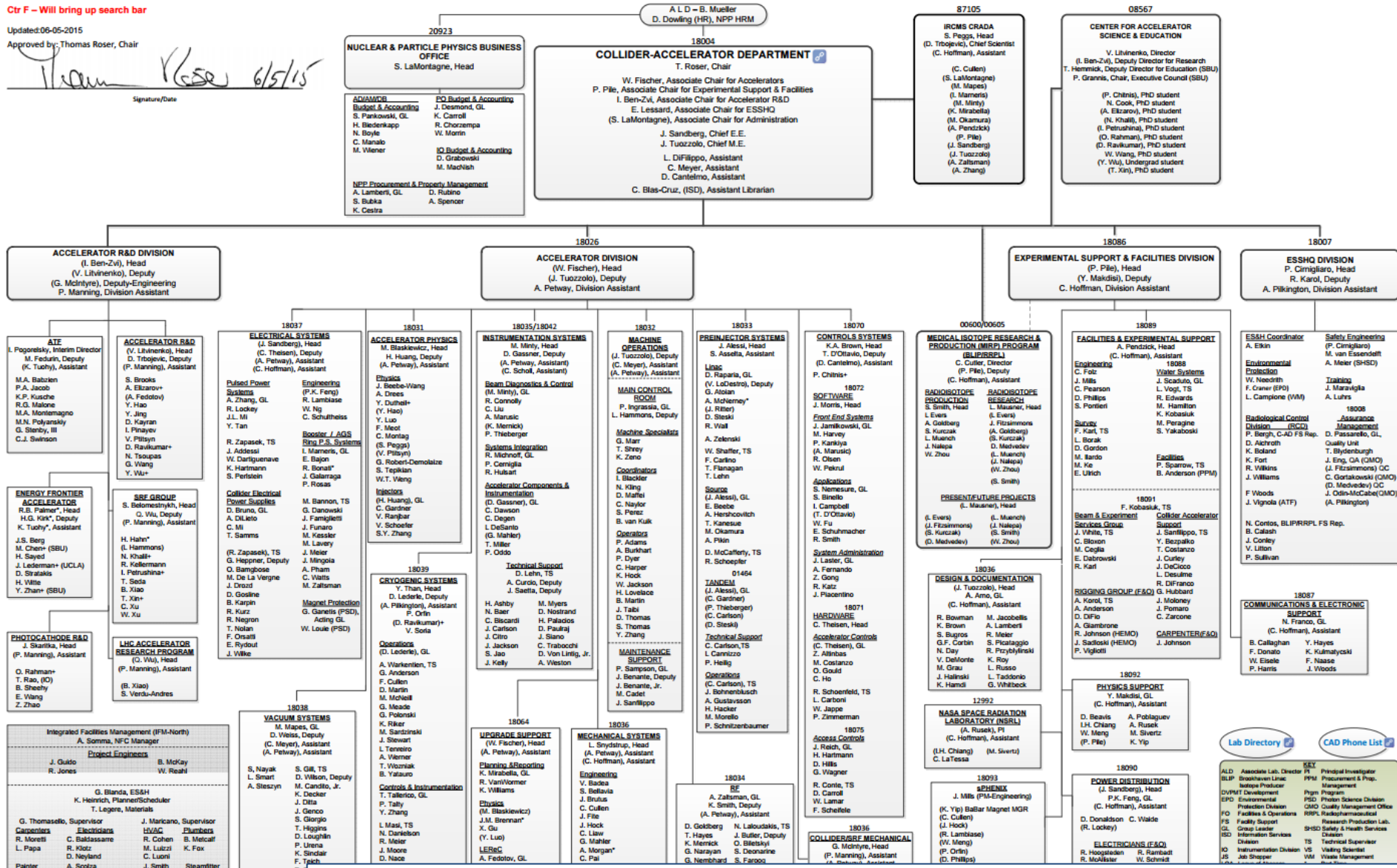
V. LitvinenkoやD. Kayran など、
ERL関連の大部分はこちらに

Ctrl F -- Will bring up search bar

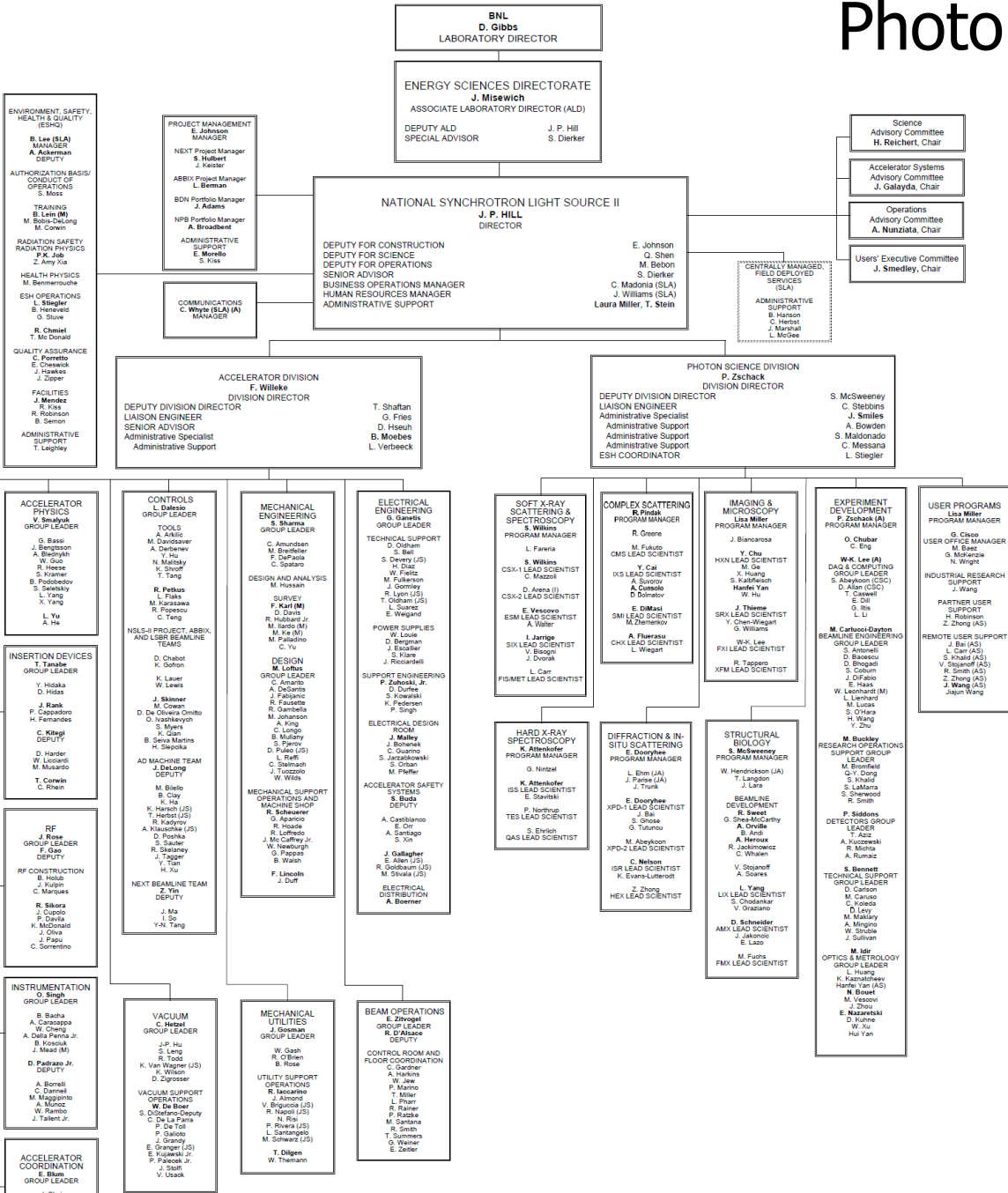
Updated:06-05-2015

Approved by: Thomas Roser, Chair

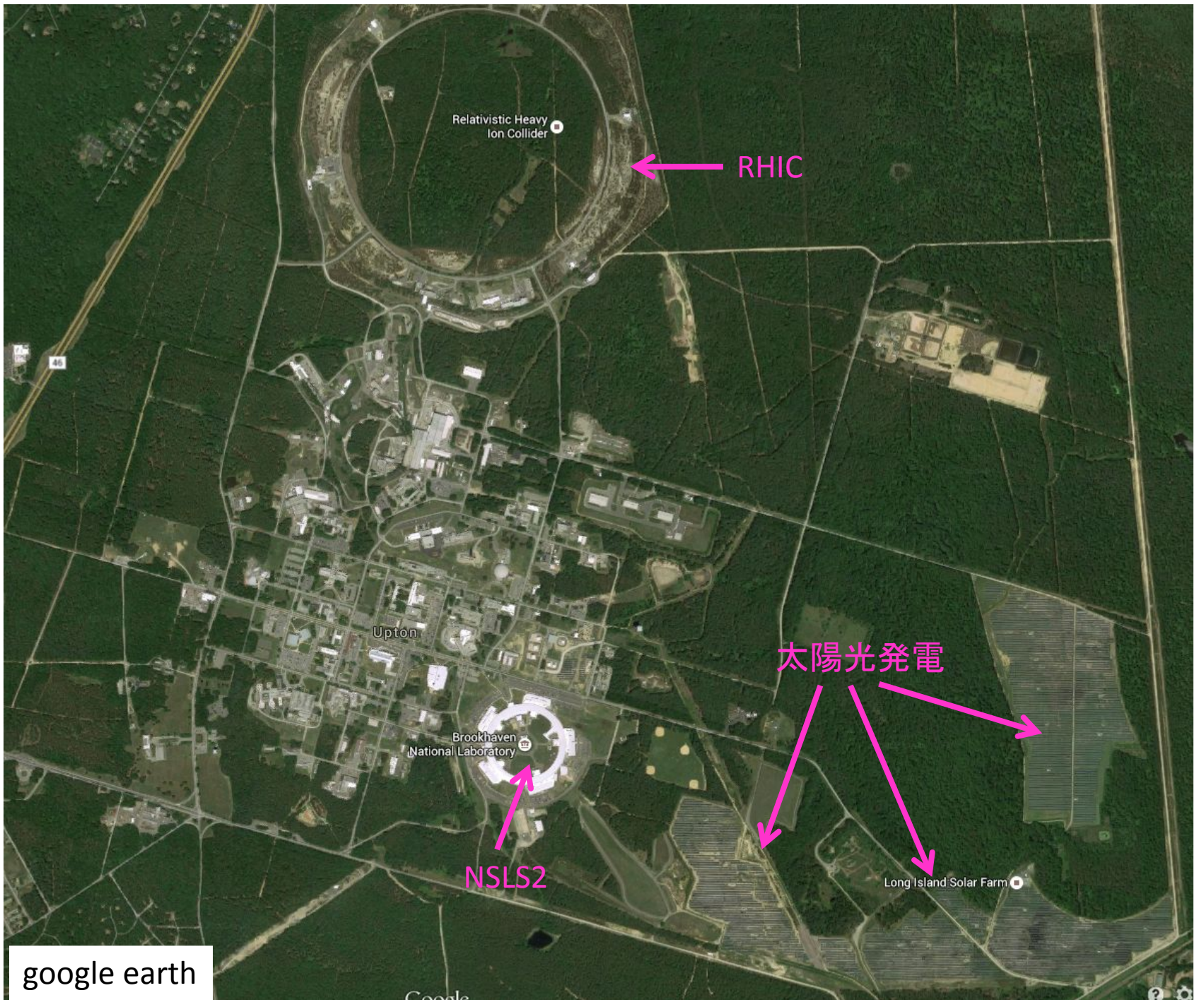
Signature/Date
Thomas Roser 6/5/15



Photon Science の組織図



- 意外とビームラインの人が少ない？
- 加速器の建設フェーズが終わり、人がいなくなってきたという話もあるが...



Relativistic Heavy Ion Collider

RHIC

Upton

Brookhaven National Laboratory

NSLS2

太陽光発電

Long Island Solar Farm

google earth

Google

