

# **FAIR & GSI**

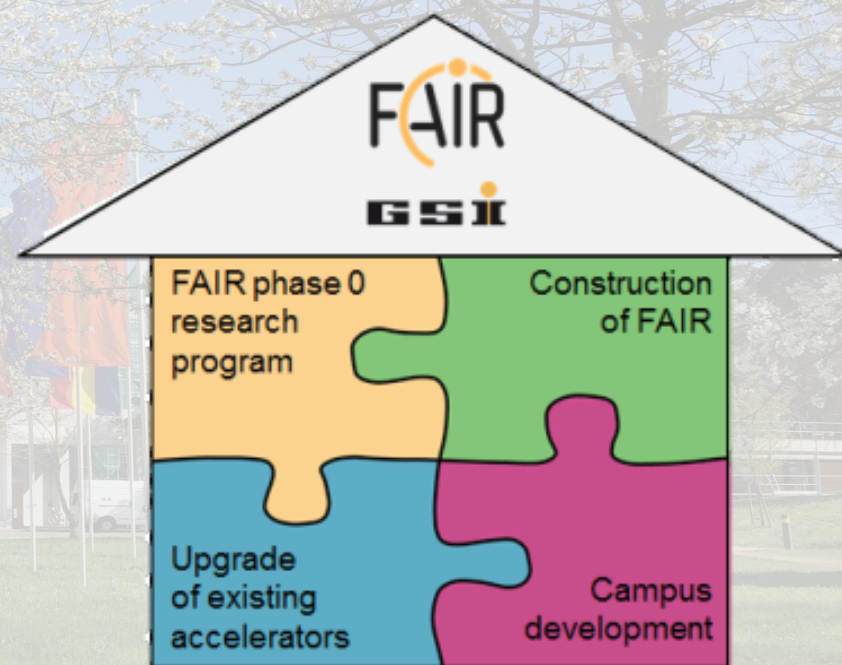
## **- Strategy, Organization, Campus, Status -**

J. Blaurock

May 25th 2020

# AGENDA

- Covid-19 Pandemic Situation
- Development on Campus
- FAIR phase 0 research program
- Upgrade of existing accelerators
- Construction of FAIR





- Significant impact on FAIR GmbH and FAIR Project
- Safety measures in place for employees and people involved in FAIR Project
- Activities at the construction site and on Campus to continue as far as possible whilst keeping safety as top priority
- FAIR suppliers and institutions also strongly affected



# Development on Campus



- Developing the buildings and facilities in view of the future operation of FAIR is one of the strategic goals of both FAIR and GSI.
- Two Measures taken to develop the Campus as a host lab and to provide a state of the art workplace and accompanying infrastructure are:

## FAIR Control Centre

- Hosting the Main Control Room and some 200 work places
- Operation planned during year 2024



Sketch of the building: view of the visitors gallery and main control room in the front.

## Parking Garage

- Providing parking space for approx. 800 cars
- Completion planned in Q1 2021



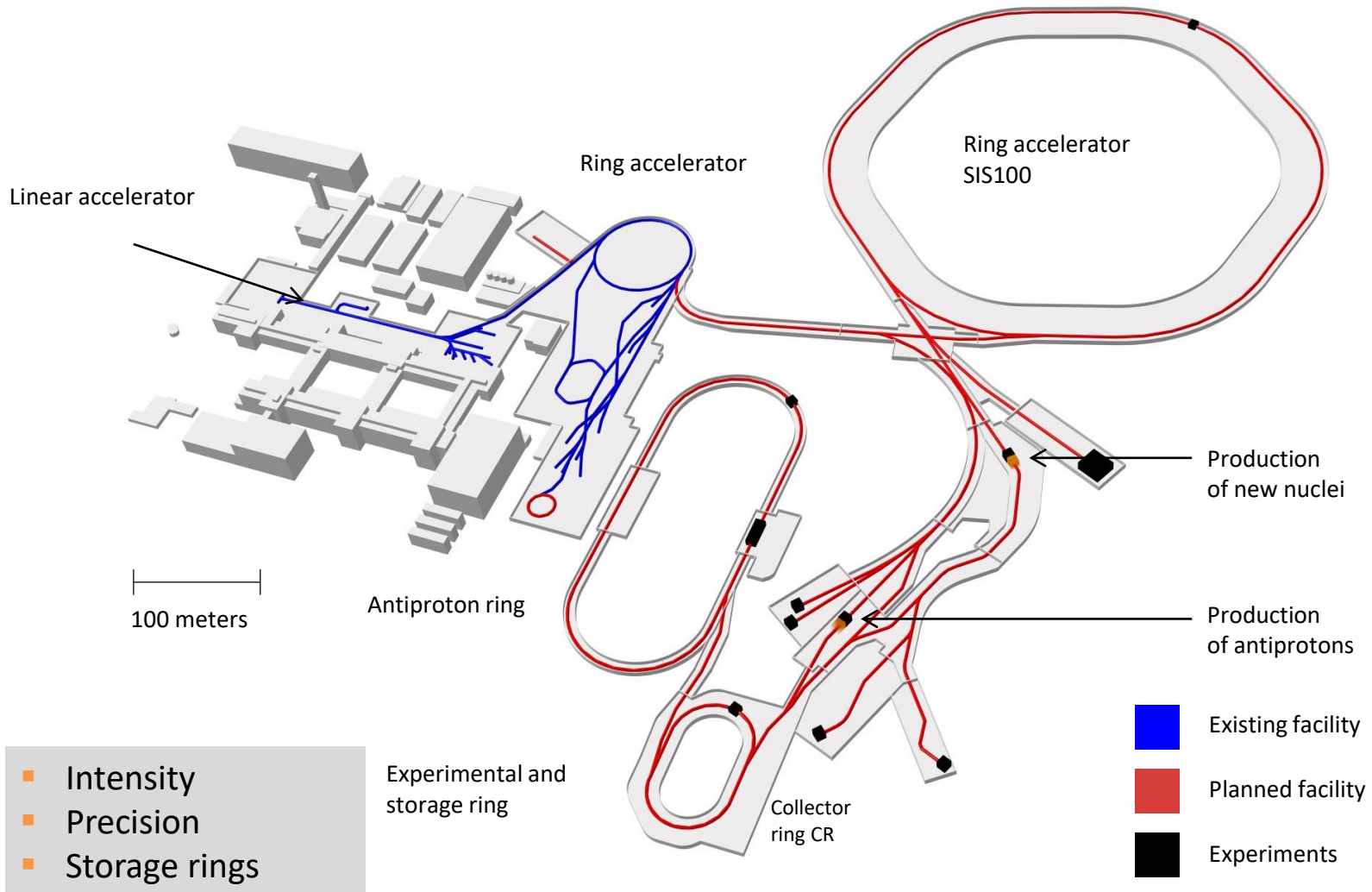
Picture showing the current status of civil works of the parking garage mid-April 2020.

- Following the successful 2019 run
  - 2020 run started in Feb as planned
  - Thanks to financial support by FAIR partners
    - Finland, France, Germany, Romania, Sweden and UK
- Impact due to Covid-19 outbreak
  - Travel restrictions, changed working mode (distancing)
  - **SAFETY first** rule on campus, only experiments which could be performed satisfying safety rules have been performed.
- Nonetheless, about 2/3 of the planned experiments could be completed
  - Thanks to excellent preparation of experiments by international collaborations, strong engagement of local people and remote involvement
- Research projects are being developed to contribute to the management of the Covid-19 pandemic (BIOMAT collaboration)





# FAIR – The facility



- Intensity
- Precision
- Storage rings



## Construction of FAIR

### FAIR Project Progress Highlights

- a. Accelerator
- b. Civil Construction
- c. Experiments

### FAIR Next Steps



*April 2020*

Awarding of the building shell south  
to Züblin & Strabag (GER) and  
firefighting system to Multimon (GER)

*November 2019*

The first integrated SIS100  
Quadrupole Doublet Module arrived  
at GSI for testing



*March 2020*

5 HEBT- Dipole Magnets were delivered for SAT testing from NIEFA (RUS) to GSI, in total we have 43 out of 51 magnets on campus



*December 2019*

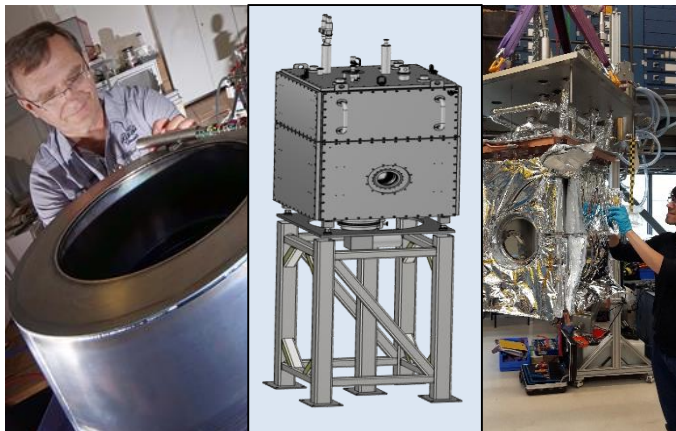
In- Kind contract for the delivery of a transport vessel for irradiated materials stemming from the SuperFRS target area has been signed between Sweden (shareholder), Finland (provider) and FAIR





*February 2020*

After 10 years of R&D, First Cryogenic Current Comparator detector for absolute, highly accurate beam intensities measurements in collaboration with HI Jena, Uni. of Jena and the SPARC Collaboration, is ready for testing in CRYRING



*February 2020*

First meeting of the In-kind Monitoring Group took place on 4th February 2020 at GSI





## Construction of FAIR

### FAIR Project Progress Highlights

- a. **Accelerator**
- b. **Civil Construction**
- c. **Experiments**

### FAIR Next Steps

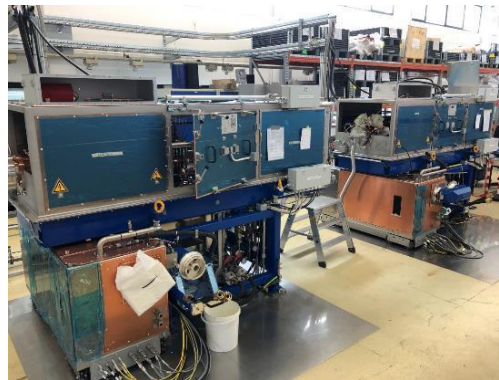


# FAIR Project Progress – ACC SIS100

- 101 of 110 superconducting dipole magnet manufactured
- FOS quadrupole module delivered and cold tested, series production of quadrupole units to ramp up by JINR Russia
- MoU with CERN signed on simulations on electrical stability of bus bar systems
- Series production of acceleration cavities progresses well
- Both injection septum magnets manufactured and in FAT at Danfysik
- Production of cryogenic bypass lines started. Delivery of first series item in Q2 2020
- International expert review on special split feed box design



FOS quadrupole module at GSI



Series production of acceleration cavities at RI



Split feed box design

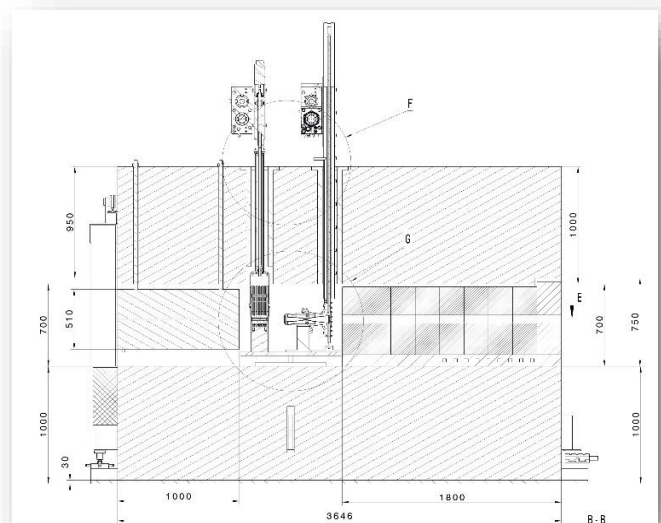
# FAIR Project Progress – ACC SuperFRS

- Lateral iron shielding awarded (Gießerei Coswig, DE)
- Test FoS SC magnets at CERN -> qualification of quadrupole successfully done
- Status of BINP IK-Contribution and collaboration agreements:
  - *CDR NC dipoles completed*
  - *R&D NC multipoles provided a technically realizable solution*
  - *CDR FoS diagnostic vacuum chambers completed*
  - *Cooperation Agreement for the design of the branch box of Local Cryogenics signed*
- Cooperation Agreement GSI-WUST (Poland) signed; relevant for Local Cryogenics
- Beam Catcher: Contract with Bose Institute (India) circulating for signatures; FDR-1 done
- ToF detectors: agreement achieved, contract with Ioffe (Russia) circulating for signatures



# FAIR Project Progress – ACC pLinac/ pbar Target

- The commissioning of the proton source and the low energy beam transport (LEBT) built at CEA is finished. All components are currently being prepared for transport to GSI.
- The low level tuning on the ladder RFQ prototype has been completed. The RFQ was assembled and vacuum tested.
- Design and radiation protection simulations for pbar target station are progressing

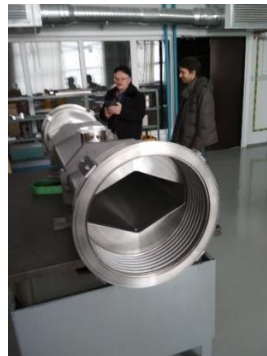


# FAIR Project Progress – ACC Collector Ring

- All 5 RF – cavities for debunchers have been delivered to FAIR/GSI.
- Stochastic Palmer Pick-UP has been constructed. SAT passed successful. It was delivered to FZJ for further test in COSY ring with a beam.
- The collaboration work between GSI and FZJ experts is established regarding Stochastic Cooling system at the CR. The corresponding contract is under preparation.
- Production of FoS CR dipole magnet is ongoing. FAT is planned in July 2020.
- Production of other CR components (correctors, BPM, power convertors, vacuum chambers) is ongoing at BINP
- 4th BINP - FAIR Workshop will take place on 25th – 29th May 2020 via Video conference



Yoke for CR dipole



Wide  
Quadrupole-  
Sextupole  
vacuum  
chamber



Palmer pick-UP tank

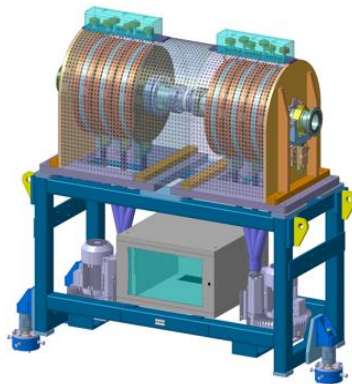


# FAIR Project Progress – ACC HESR

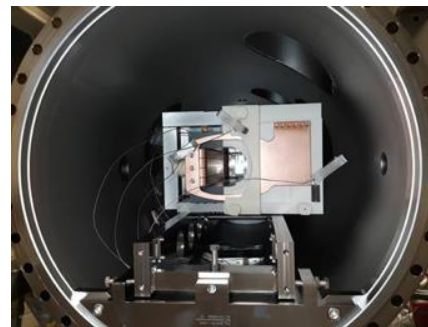
- 46 Dipoles are delivered. 4 (SPARC) are in Jülich, 42 are in storage hall Weiterstadt
- All 84 Quadrupoles are in Jülich. Assembly on girders in preparation. Waiting for delivery of BPMs and ion clearing chambers
- Romania: continuous delivery of sextupoles, steerers and their power converters to Jülich. EMC measurements (SAT) started
- Most other power converters are in Jülich
- Injection kickers in production. Progress with pulsers and protective covers
- All stochastic cooling tanks produced. Assembly on girders started



Sextupole & steerer power converters



Barrier bucket and acceleration cavity



Injection kicker assembly



Stoch. cool. kicker with girder

# FAIR Project Progress – ACC COMMONS

- 46 FAT at NIEEFA in February 2020 of HEBT Magnets: now 43 of 51 magnets are manufactured and accepted. Delivery took place at the end of March 2020.
- FAT at BINP at the end of February 2020: Further magnets manufactured.
- In April 2020 the Collaboration Agreement was signed between CNPEM, Brazil and GSI/FAIR GmbH for HEBT RT DAQ development and other project of common interest, e.g. BPM orbit studies.
- 36 power converters of HB.C1 type have been delivered to storage hall Weiterstadt in April 2020



FAT at NIEEFA



FAT at BINP



Power Converter in storage hall



## Construction of FAIR

### FAIR Project Progress Highlights

- a. Accelerator
- b. Civil Construction
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### FAIR Next Steps

# FAIR Project Progress – Civil Construction

## Status FSB Procurement and Contracting

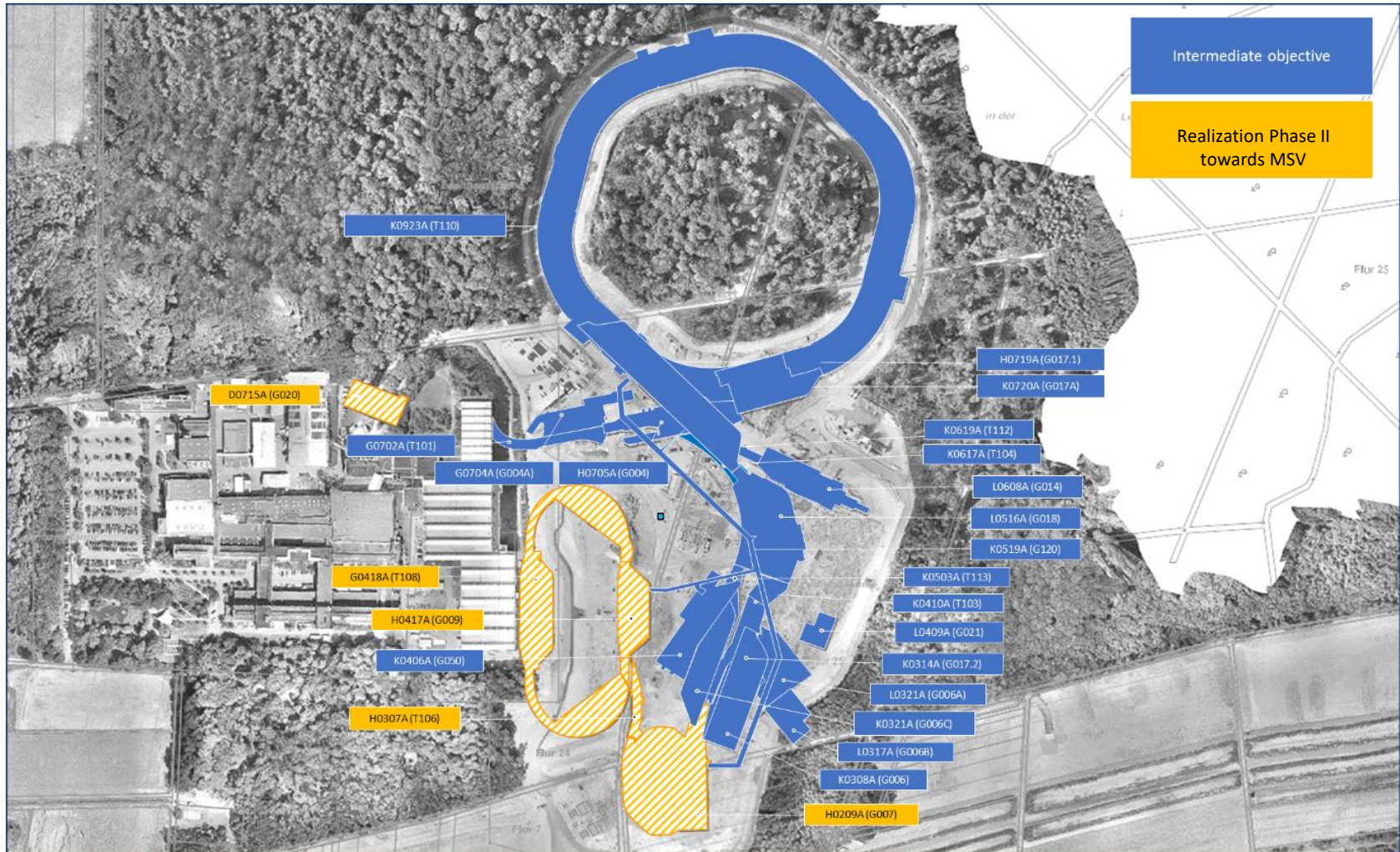


Pos.	Awarding Item	Company	Status	Contract Award Date
VE 300-025	Excavation Building Area „North“	ABN consortium	awarded	26.05.2017
VE 300-026	Building Shell Construction Area „North“	PORR	awarded	29.01.2018
VE 300-029	Site Power Supply and Site Security	GAT	awarded	29.01.2018
VE 300-027	Site Logistics and Temporary Services	ZÜBLIN	awarded	19.03.2018
VE 300-028a	Elevators	TAG	awarded	09.04.2018
VE 400-008	Special Cranes	Rudolf Fritz	awarded	24.06.2019
VE 400-009	Normal Cranes	AXXIA	awarded	27.08.2019
VE 400-004	Firefighting Systems	MULTIMON	awarded	09.04.2020
VE 300-031	Building Shell Construction Area „South“	ZÜBLIN	awarded	22.04.2020



# Civil Construction – FSB Procurement & Contracting

Scope of work „Intermediate objective (IO)“ and „Realization phase II towards MSV“





# FAIR Project Progress – SIS100 Ring accelerator



*New Drone Video Available – early May 2020*



**FAIR**  
RING ACCELERATOR SIS100



# FAIR Project Progress – SIS100 Ring accelerator

Excavation SIS100 tunnel completed



Transfer Building







## Construction of FAIR

### FAIR Project Progress Highlights

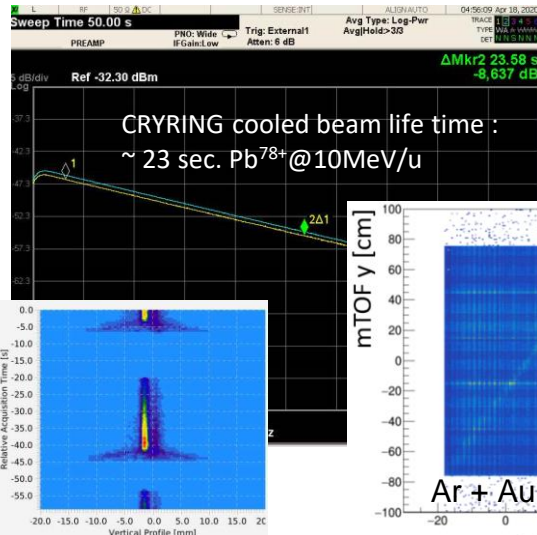
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### FAIR Next Steps

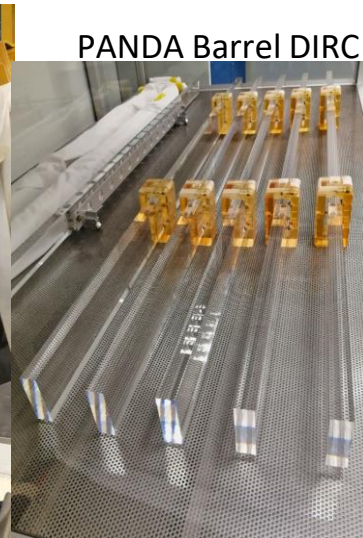
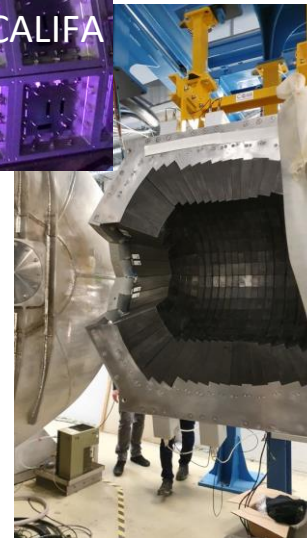
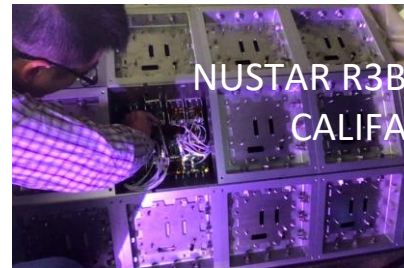
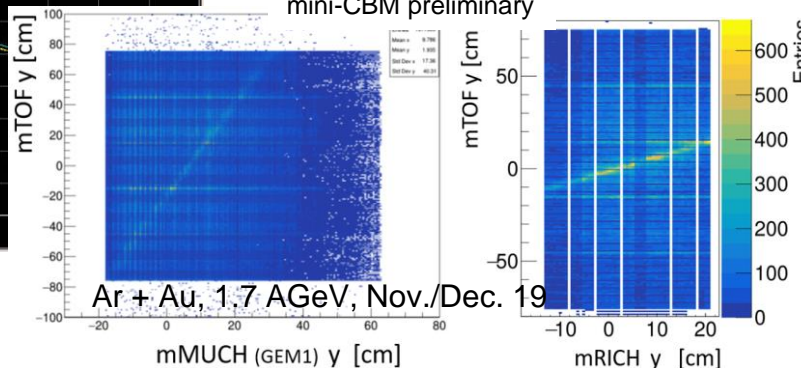


## Main Achievements

- Stable storage-ring operation of CRYRING including injection from ESR and e-cooling allowing for first experiments of the APPA-CRYRING programme of FAIR Phase-0.
- Verification of the free-streaming concept for the DAQ system of CBM through experiments in FAIR Phase-0 with mini-CBM.
- Mechanical support structures for NUSTAR R3B CALIFA completed and crystals mounted therein.
- First ten fused silica bars for the PANDA Barrel DIRC delivered for evaluation, in order to start series production after verification.



mini-CBM preliminary





## Construction of FAIR

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## FAIR Next Steps

- Delivery of all ACC components as per baseline schedule defined beginning 2019
- Implementation of Intermediate Objective as per Council Decision in February 2020
- Support the positive decision process of all Shareholders to provide the necessary additional commitments and funds for the full FAIR MSV in a timely manner, preferable in the year 2020



Thank you for your attention !

