

FAIR & GSI

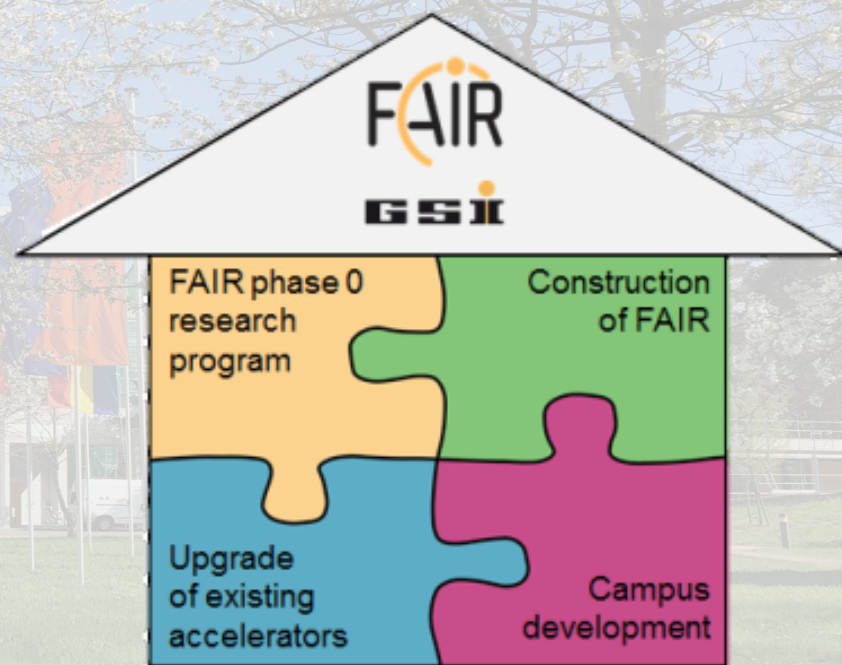
- Strategy, Organization, Campus, Status -

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

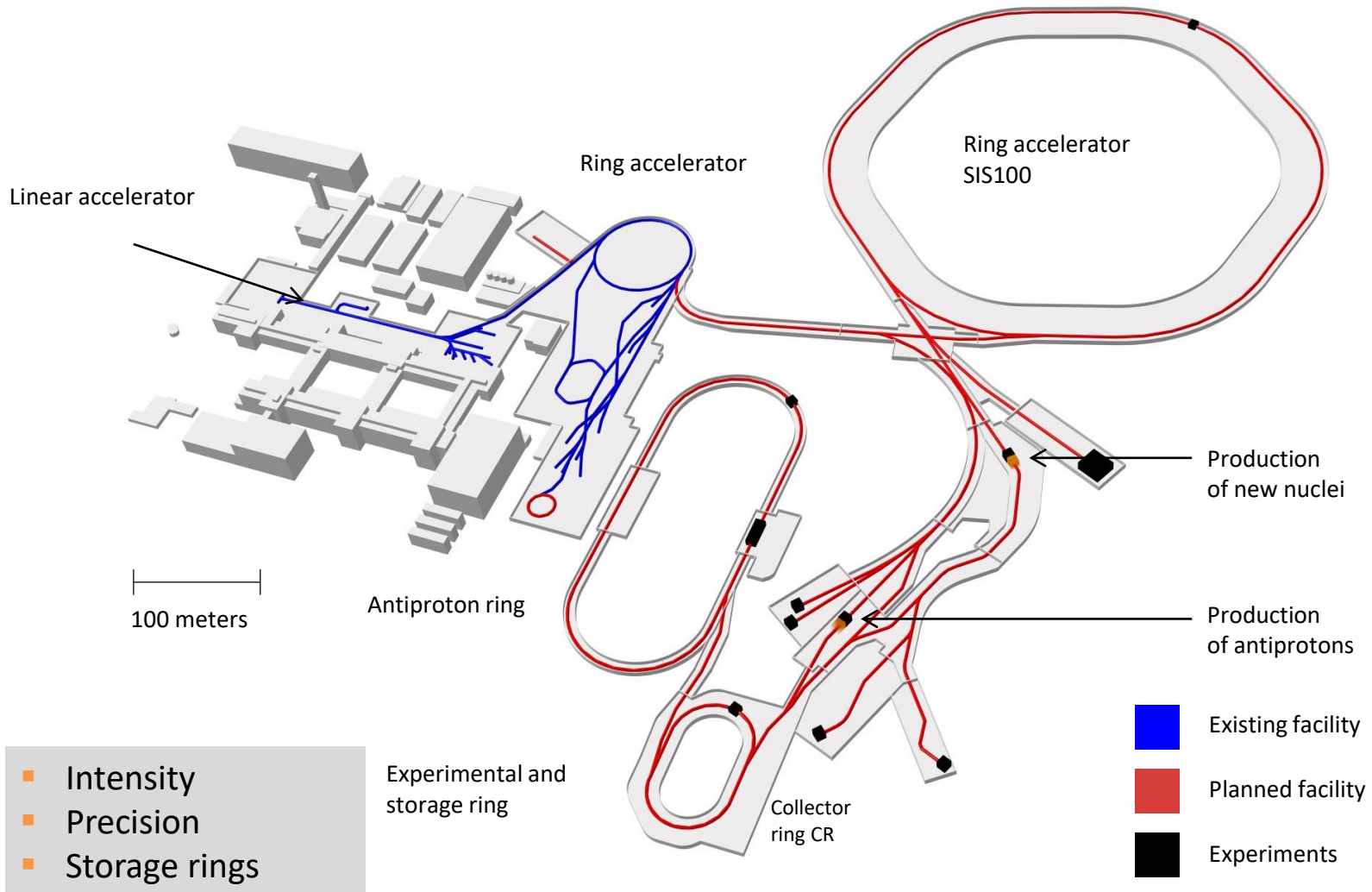


Picture showing the current status of civil works of the parking garage mid-April 2020.

- 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





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



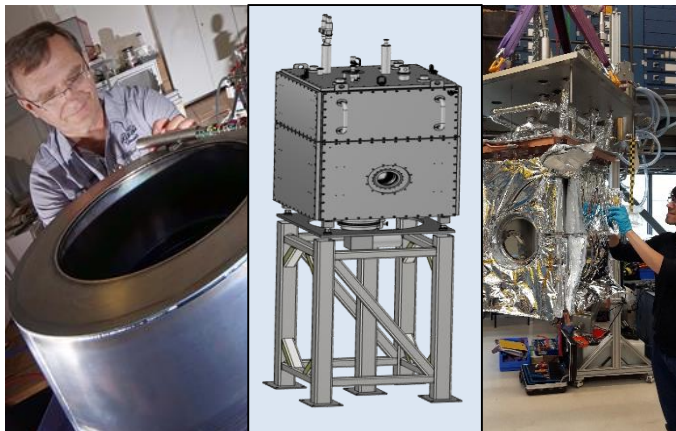
December 2019

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





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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

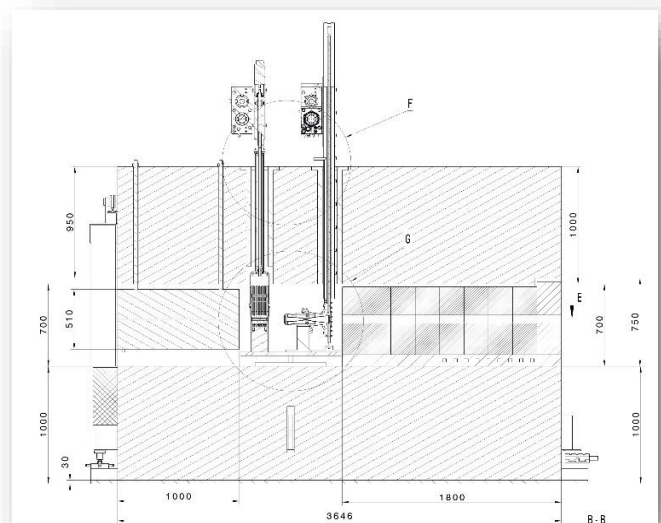
FAIR Project Progress – ACC SuperFRS

- 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

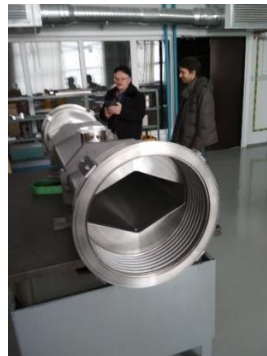


FAIR Project Progress – ACC Collector Ring

- 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



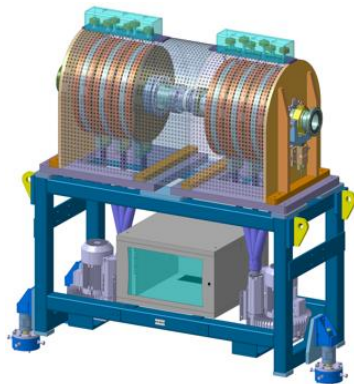
Palmer pick-UP tank

FAIR Project Progress – ACC HESR

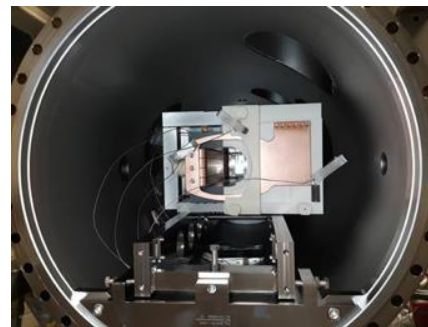
- 46 Dipoles are delivered. 4 (SPARC) are in Jülich, 42 are in storage hall Weiterstadt
- All 84 Quadrupoles are in Jülich. Assembly on girders in preparation. Waiting for delivery of BPMs and ion clearing chambers
- Romania: continuous delivery of sextupoles, steerers and their power converters to Jülich. 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

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FAIR Next Steps

FAIR Project Progress – Civil Construction

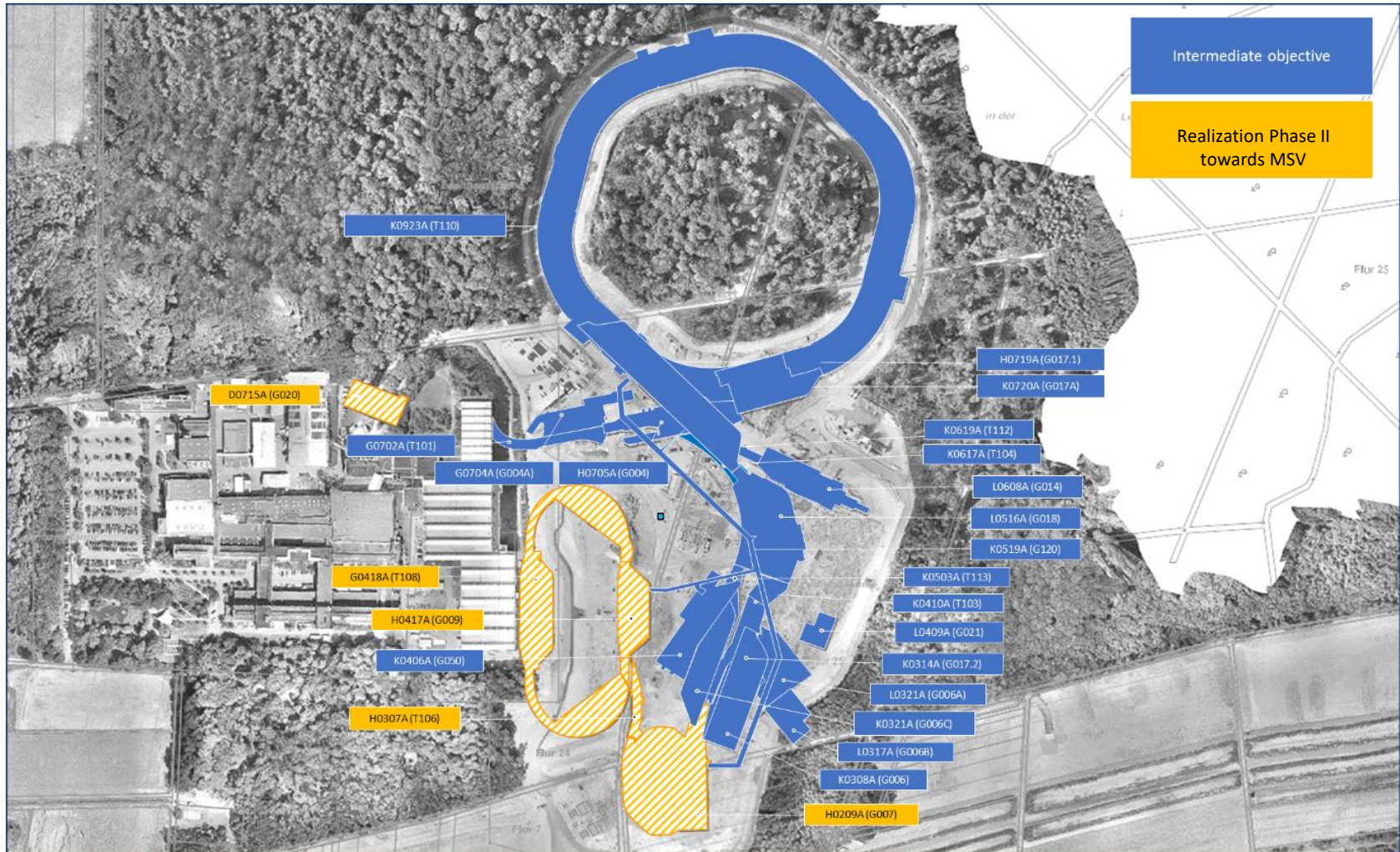
Status FSB Procurement and Contracting



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

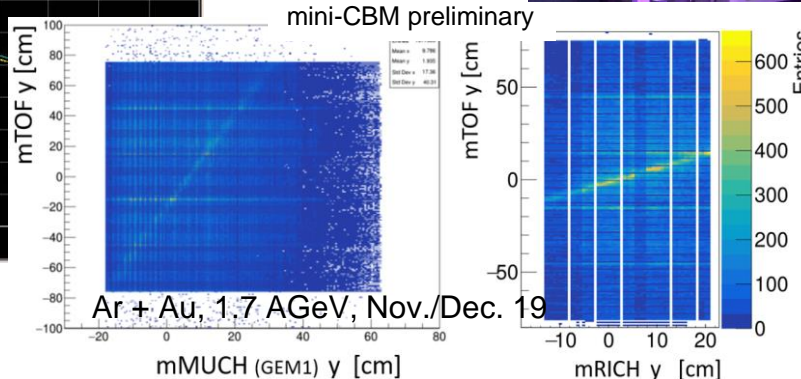
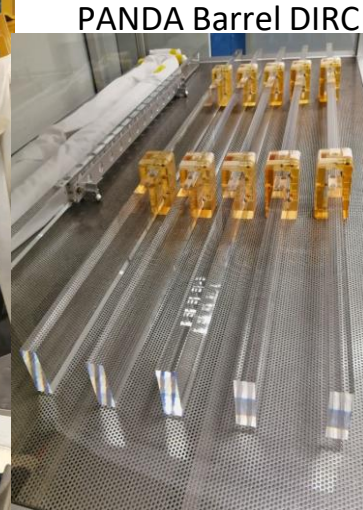
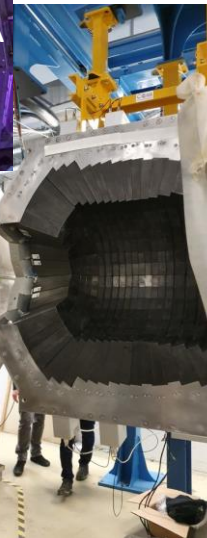
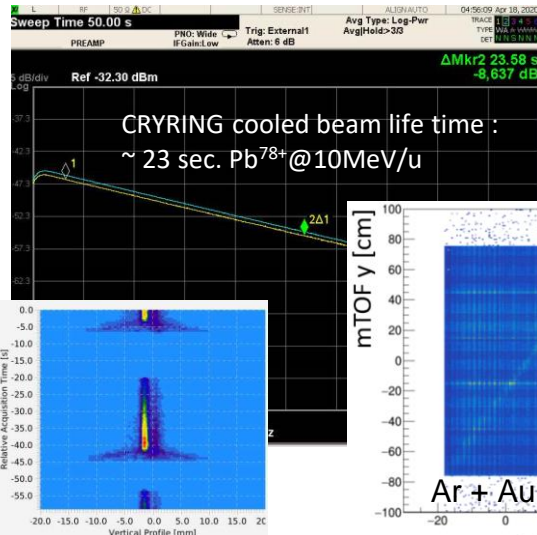
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FAIR Next Steps

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.





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 !

