



# Status of BINP collaboration with FAIR

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<b>FAIR CONTRACTS</b>				
	<b>Number</b>	<b>Description short</b>	<b>Amount, Euro</b>	<b>Paid, Euro</b>
1.	<b>dated 10.03.2017</b>	Panda SC Magnet	7 270 000,00	3 110 000,00
2.	<b>CC 2.3.2-2</b>	HEBT magnets	18 564 771,43	5 493 420,10
3.	<b>CC 2.5.2.1.</b>	Dipole magnets	13 688 016,19	1 435 469,76
4.	<b>dated 12.12.2016</b>	CBM magnet	4 961 649,82	1 902 600,24
5.	<b>CC 2.4.2.1.1.2</b>	Dipole magnets	3 801 092,00	1 015 252,00
6.	<b>CC CR.HOAI</b>	CR responsibility	8 495 805,00	2 352 004,90
7	<b>CC 2.5.2.2.1</b>	CR components	19 277 179,92	2 179 801,57
8	<b>AFAA1 to CC 2.4.2.1.1.2 for 2.4.7.1.12.1</b>	Vacuum chambers	1 114 025,25	74 798,85
9	<b>CC 2.3.7.1.2.3.2 as AFAA2 to CC 2.4.2.1.1.2</b>	HEBT vacuum chambers	1 713 363,67	179 335,99
10	<b>CC 2.4.7.1.2.2.1 as AFAA3 to CC 2.4.2.1.1.2</b>	Dipole magnets	870 846,74	82 564,66
11	<b>AFAA4</b>	Vacuum components HEBT-4	4 178 807,41	799 350,69
12	<b>AFAA5</b>	Beam pipes and chambers	1 654 201,05	<b>Not signed</b>
13	<b>AFAA6</b>	P-bar quadrupoles	1 450 402,23	<b>Not signed</b>
		<b>TOTAL</b>	<b>87 040 160,71</b>	

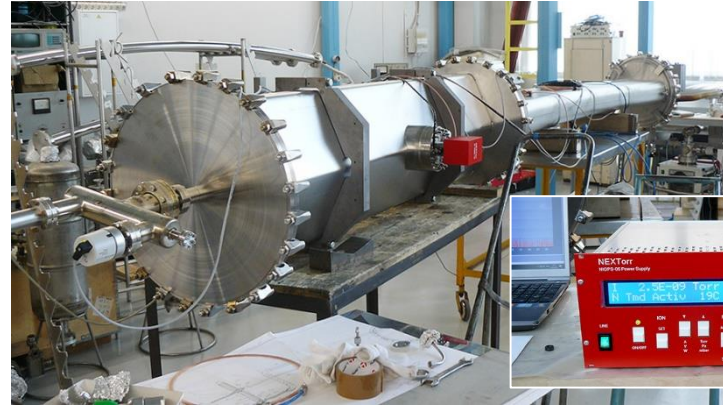
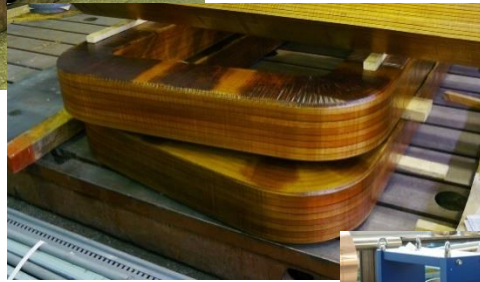
<b>GSI CONTRACTS</b>				
	Implementing agreement dd 28.06.2018	Dipole magnet development	300,000.00	
	Accelerator Implementing Agreement No.2 dd 25.11.2019	S FRS Feedbox development	220 000,00	
	Agreement 31.01.2020	PS Second Module	410 000,00	
		<b>TOTAL</b>	<b>630 000,00</b>	

# Collector Ring

Contracts	Matter	Value	Absorbed	Signed
CC CR.HOAI	Technical coordination	8,495,805.00	2,352,004.90	19.08.2014
CC 2.5.2.2.1	CR WPs: magnets; PCs; vacuum; kickers; septa; diagnostics, TCR1 beamline	19,277,179.92	2,179,799.29	26.06.2018
CC 2.5.2.1	CR dipoles	13,688,016.19	n/d	12.10.2015



FoS dipole production:  
yoke parts and coils



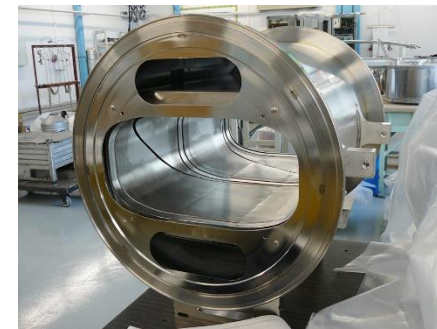
Assembly of dipole  
and quad chambers  
prototypes test:  
vacuum achieved!



Scintillating  
screen  
plates



FoS wide  
steering  
magnets



Wide pickup prototype

Scrapers supports



# HEBT magnets batch 2-4 (CC2.3.2-2)

Dipole 4_0	2
Dipole 10_0	6
Dipole 13_0	2
Dipole 13_3	3
Dipole 19_0	4
Dipole 15_0	4
Dipole 15_1	1
Dipole 16_0	1
Dipole 17_0	1
Quadrupole 2	90
Quadrupole 2 long	4
Quadrupole 10	4
Quadrupole 11	70
Quadrupole 12	12
Steering 13	5
Steering 18	48
Steering 100	45
Total magnets	<b>303</b>

Total  $\approx$  18 000 000 euro

Final delivery until October 2021



Delivered 49 magnets

Ready for delivery 27 magnets

Ready for FAT 23 magnets

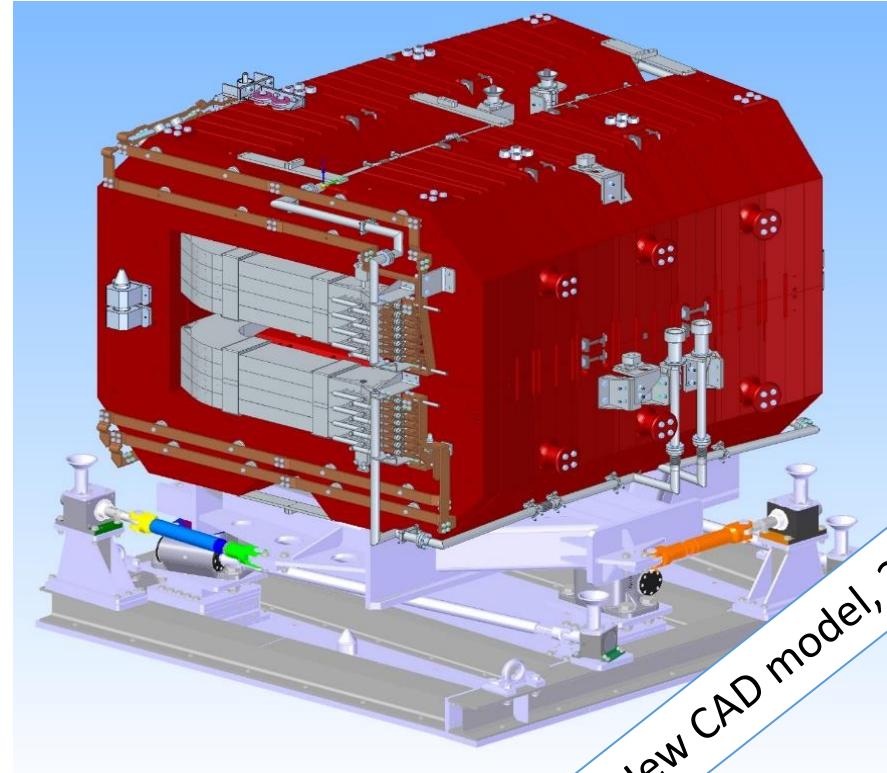
# Vacuum component contracts

Name	Signed	End	Cost M€	Status
<b>AFAA1 SFRS Diagnostic chambers</b>	03.2019	12.2021	1.11	CDR for FoS is passed. 2D and FEM analysis for FOS are uploaded into EDMS (for FDR) and accepted as Materials for FoS production are ordered.
<b>AFAA2 HEBT Batch 2-3 Vacuum chambers</b>	05.2019	07.2021	1.71	There is delay but not critical. CDR – 50%. 2D drawings – 30%. 70% of materials are under ordering. First FAT is expected in July 2020.
<b>AFAA3 SFRS Vacuum chambers inside SC dipoles</b>	10.2019	06.2022	0.87	3D model of combined chamber with pumping port is created. There is a problem with bellows fixation. Conception of assembly the combined chamber into SC magnet under consideration.
<b>AFAA4 HEBT Batch 4 Vacuum chambers</b>	11.2019	12.2022	4.18	3D model of most complex chamber (x-cross) is accepted. 2D drawings of the x-cross chamber, standard pumping ports, drift chambers and supports are under consideration at BINP workshop
<b>AFAA5 SFRS vacuum components</b>			1.5	Time schedule is agreed. Cost under consideration. Waiting detailed specification
<b>SFRS branching chambers inside SC dipoles</b>			0.31	BINP agrees to produce the chambers

## CC 2.4.2.1.1.2 (03.2019 – 10.22)



PROTOTYPE, 2010



New CAD model, 2020

TOTAL: 3801092.00 EUR

FAIR supplies cable to BINP

TOTAL – Cable Cost = 2900720.00 EUR

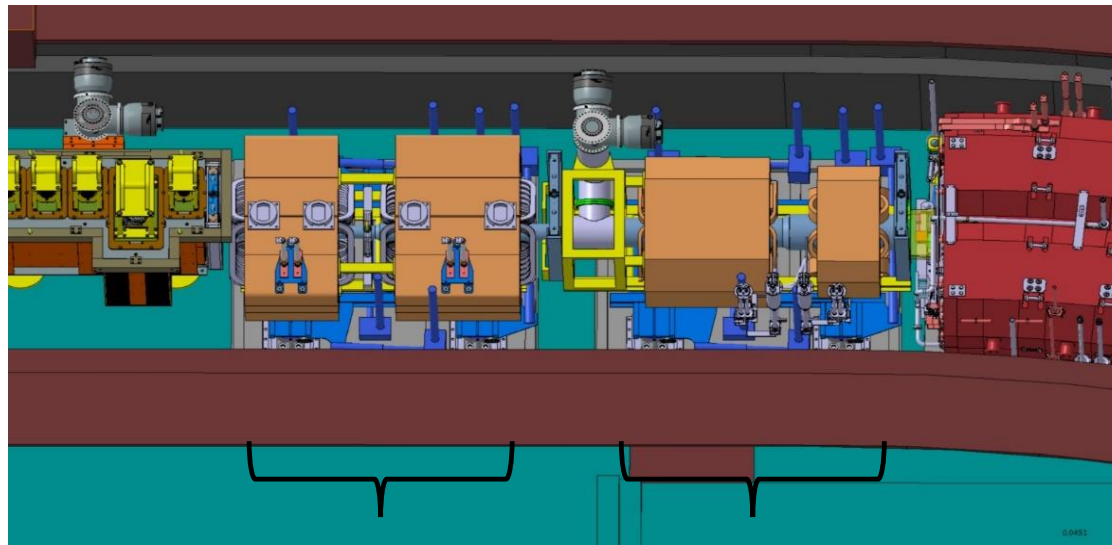
Two radiation resistance magnets based on a design of the 2010 prototype.

## 2.2.05.0121 Accelerator Implementing Agreement No. 1, GSI (end date is of May 2020)

Total: 75000.00 EUR

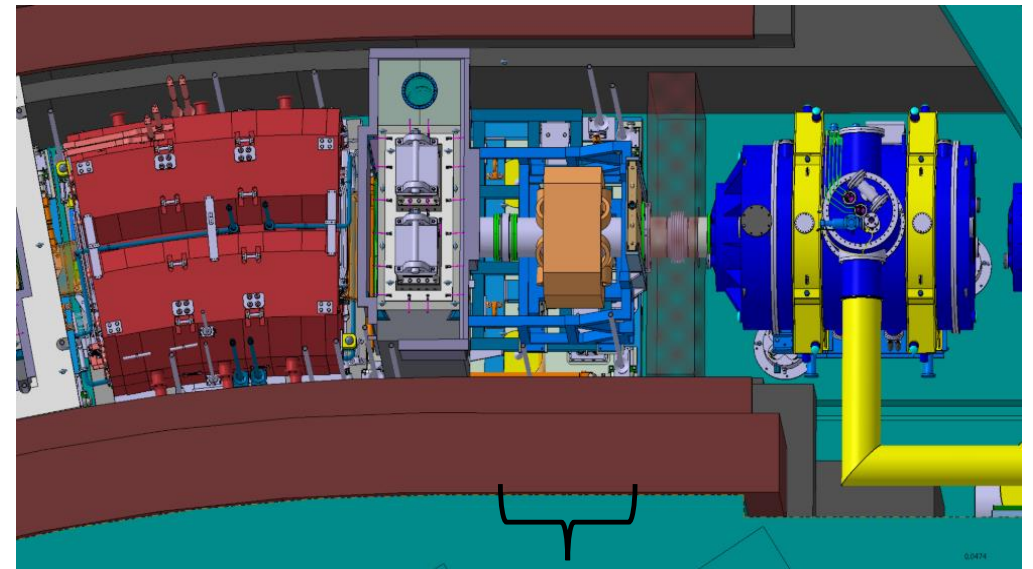
Development of 3 quadrupole and sextupole SFRS magnets.

3D magnetic field simulation has been done. 3D design is under completion.



Quad-Quad  
Assembly

Quad-Sext  
Assembly



Single  
sextupole

# Summary

- FAIR is (one of the) greatest and important BINP collaborator in the history.
- Friendly and productive communications were established between two teams.
- In spite of many problems and particularly difficult present period, BINP does it best to fulfill all responsibilities.
- I propose to establish a FAIR-BINP coordination group (small enough, 5+5 or even less), which will have a zoom meeting every month (or once per two weeks) to discuss and solve current issues and problems.