



SIS 300 activities at GSI

H.Müller, GSI

Content



- Status of FAIR
- Collaborations
- Other

Status of FAIR



- Modularized start version containing SIS 100 superFRS +...
- SIS 300 is part of phase B, i.e. not in start version
- Buildings and infrastructure are planned in a way that an implementation of Phase B components is easily possible
- Aim is the full version of FAIR

INTAS wire/cable

The logo for FAIR (Facility for Antiproton and Ion Research) is located in the top right corner of the slide. It features the word "FAIR" in a bold, black, sans-serif font. A stylized orange arc is positioned above the letters "A" and "I", resembling a particle path or a magnetic field line.

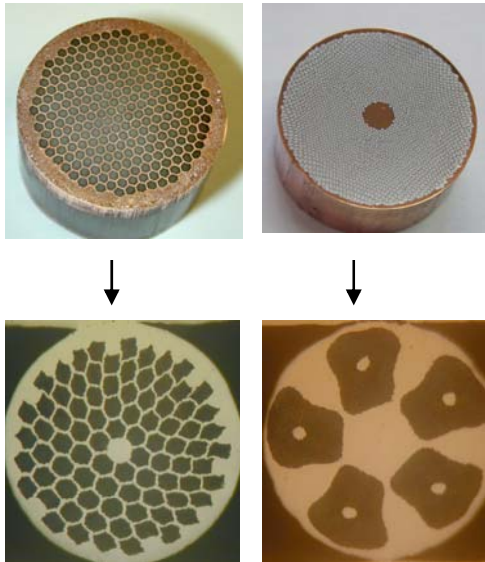
- Bochvar Institute /JINR Dubna (MT21: 1GO-06)
- INTAS project Wire and (SIS 100-)cables with CuMn interfilamentary matrix
- Minimum J_c of 2550 A/mm² for specification
- Double stacking approach is favorable
- It is planned to use this wire/cable for SIS 100 single layer dipole prototype (specifications for wire according to the INTAS results are ready)

INTAS wire/cable



TABLE I. CURRENT PROPERTIES

TABLE III. Hysteresis losses and Effective diameter



379*84

3120*5

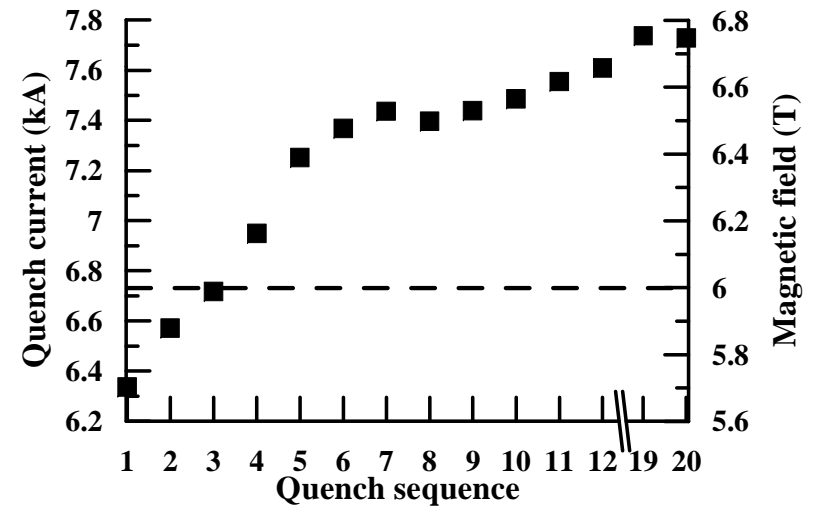
	Wire	Filament diameter, μm	Twist pitch, mm	J_c , A/mm ² (5 T; 0.1 $\mu\text{V}/\text{cm}$)	"n"
1	0.24 mm; 3132 fil. Single stacking	3.4	no	2804	38
			7	2626	33
			4	2553	25
			2	1950	19
2	0.825 mm Design 1 (379×84)	2.9	11	2548	-
			8	2552	37
			6	2561	44
3	0.79 mm Design 1 (379×84)	2.8	8	2307	33
4	0.825 mm Design 2 (3132×5)	4.2	12	2450	34
5	0.79 mm Design 2 (3132×5)	4.1	8	2373	30
6	0.5 mm Modified Design 1 (379×27)	3.1	8	2631	33

	Wire	Losses, mJ/cm ³	D_{fil} , (calc.), μm	D_{eff} , μm	$D_{\text{eff}}/D_{\text{fil}}$
1	0.24 mm; 3132 fil. Single stacking	88.3	3.4	5.2	1.53
2	0.825 mm Design 1 (379×84)	50.6	2.9	4.68	1.61
3	0.79 mm Design 1 (379×84)	30.3	2.8	4.7	1.68
4	0.825 mm Design 2 (3132×5)	71.4	4.2	7.1	1.69
5	0.79 mm Design 2 (3132×5)	44.0	4.1	6.4	1.56
6	0.5 mm Mod. Design 1 (379×27)	29.0	3.1	3.8	1.23
7	0.65 mm [2] 10644 fil. Single stacking	51	3.5	5.2	1.49
8	0.85 mm, UNK (55×162)	106	5.84	12.4	2.12
9	0.73 mm, ITER 4488 fil. Single stacking	67.4	6.7	7.6	1.13

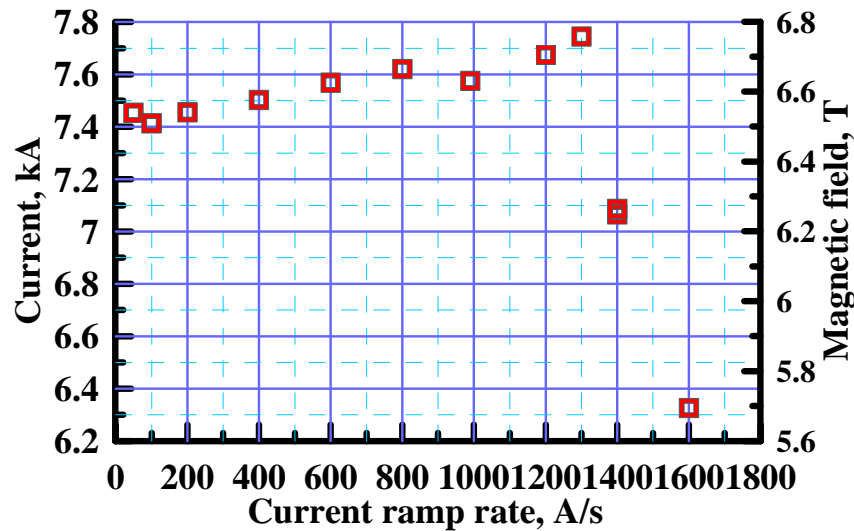
IHEP 6T Dipole



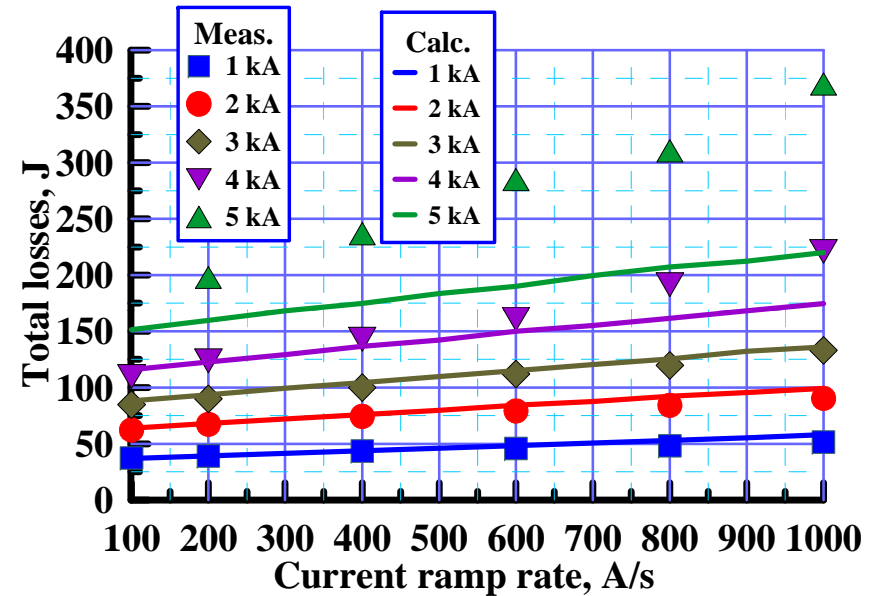
- has been finished and tested in liquid Helium (MT21: AP-22)



IHEP 6T Dipole



Quench current decrease starts at 1.15 T/S



For $I_{max} > 3kA$ higher losses than expected

IHEP 6T Dipole

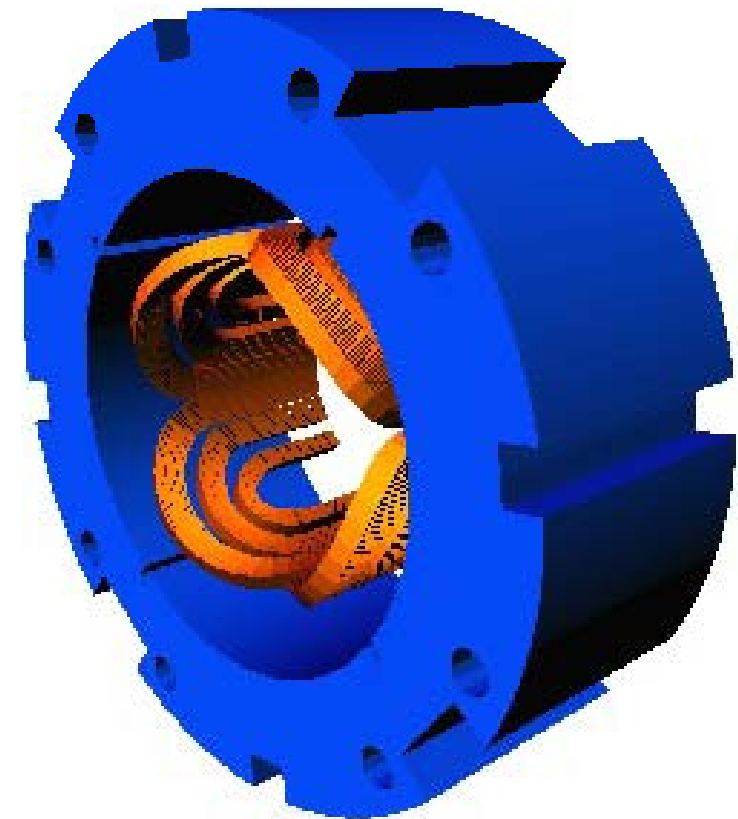
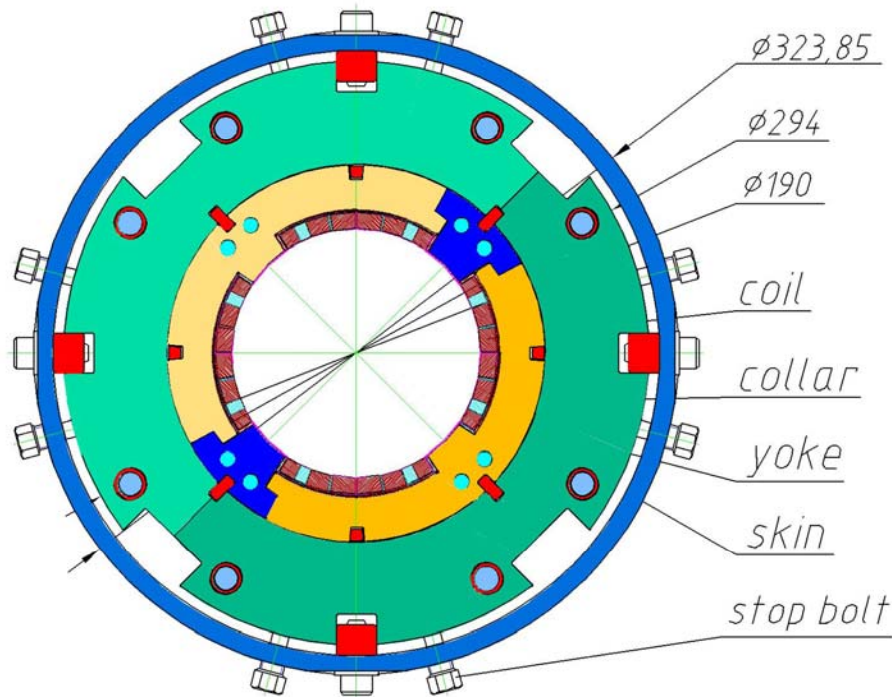


- Is on the way to be finished (end caps vacuum chamber) for tests with supercritical Helium
- As it is pressure vessel work has to be done by an external workshop
- Testing at GSI not before spring 2010

IHEP Quadrupole Design



- MT21: 1AP-02



IHEP Corrector magnets



- MT21: 1AP-02

TABLE II. MAIN REQUIREMENTS FOR CORRECTOR MAGNETS

	Strength	L_{eff} , m	t , sec
QM	1.8 T/m	0.65	2.25
SM	60 T/m ²	0.65	2.18
OM	767 T/m ³	0.65	2.24
CS	130 T/m ²	0.78	0.208
RS	325 T/m ²	1	0.5
DH, DV	0.5 T	0.65	2.27

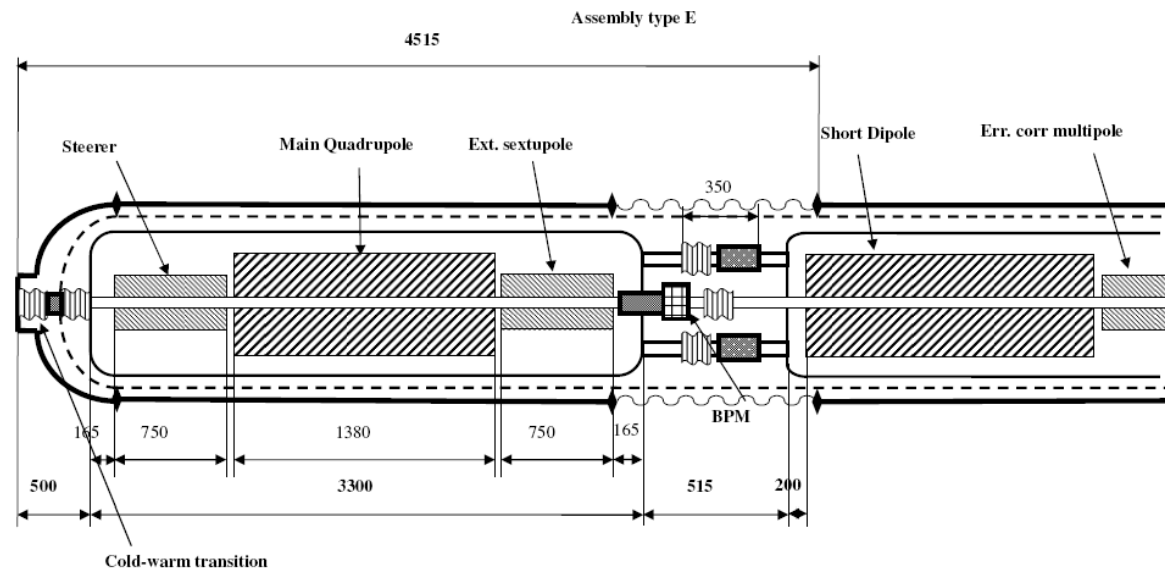
TABLE III. MAIN CHARACTERISTICS OF MAGNETS

	CS	RS	DV	DH
φ	4.911	2.466	12.954	13.425
α	14.006	14.444	41.310	40.263
N_w	2×17	4×23	2×53	2×53
R_F	67.365	71.0	71.0	71.0
I_{op}	229	236	230	231
L_t	810	1040	700	700
S	752.2	973.2	611.2	610.2
L_{eff}	780	1000	650	650
L_{eff}	788.0	1008.6	666.8	668.3
B_{max}	0.78/0.85	1.69/1.53	1.15/1.42	1.24/1.42
E	473	4358	1033	1126
L	18.0	156.5	39.1	42.2
F_x	2.8	17.6	9.2	0.3
F_y	-1.5	-13.2	-0.8	11.0
$ F $	3.2	22.0	9.2	11.0

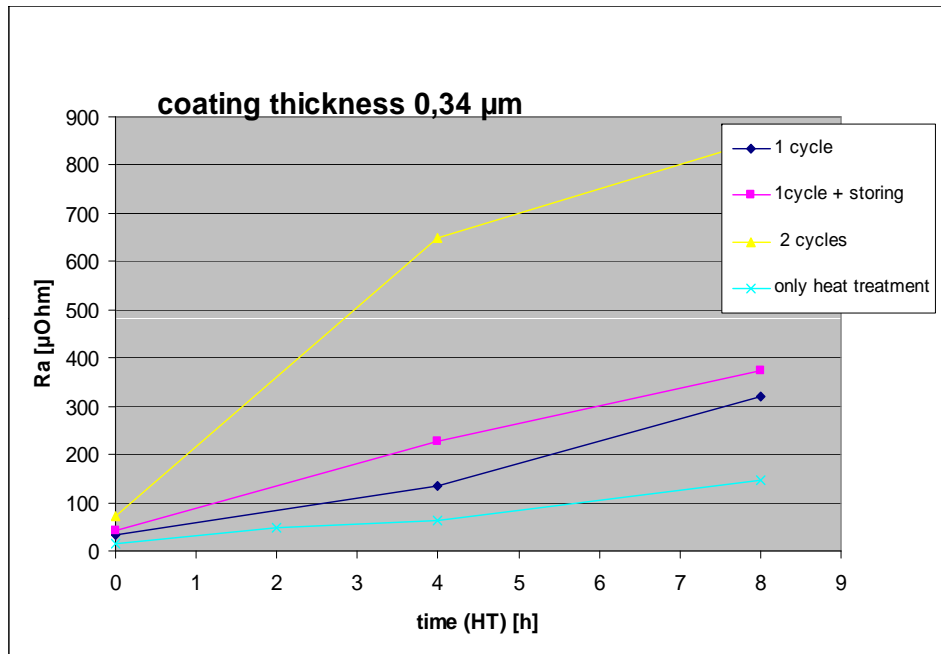
SIS 300 Lattice



- Slight upgrade concerning a repositioning of the resonance sextupoles
- Will be shifted from the end of the arc into the straights
- Final report in about 2 weeks



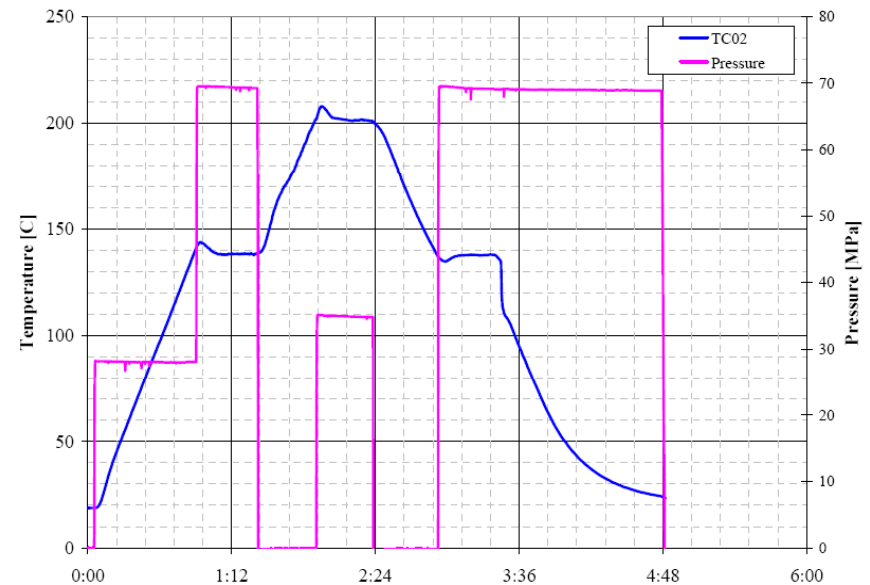
Ra Optimization



For the measurements described below, a RHIC-type cycle labeled GSI-II was used:

1. At 20°C apply 28 MPa
2. 20°C to 135°C ramp up in 50 min under 28 MPa,
3. At 135°C, apply pressure of 70 MPa and hold 30 min
4. Release all pressure and ramp up to 195°C in 30 min.
5. Apply 35 MPa and hold for 30 min.
6. Release pressure and ramp down to 135°C in 30 min.
7. Re-apply 70 MPa and hold for 30 min.
8. Cool down with 70 MPa.

A typical cure cycle is shown in Fig. 2.



For glueing: 15 Min at 80 Mpa, 185°C
Are enough

Cryostat fixation in tunnel



4.5 m tunnel height

