

FAIR Super Fragment Separator Multiplets

The FAIR project (Facility for Antiproton and Ion Research), an advanced particle accelerators and experimental facility for basic and applied research, is carried out at the site in Darmstadt. This facility is funded and built in Darmstadt (state of Hesse) in collaboration with international partners currently 16 states. The task of the realization of the plant was transferred to the FAIR GmbH, established in 2010. Each multiplet for the Super Fragment Separator (SuperFRS) consists of a combination of superconducting magnets of different type (quadrupole, sextupole, octupole and steering dipole) hosted in a common liquid helium vessel and cryostat.

ASG has been awarded of a contract for design and manufacturing of short and long multiplets.



MAGNETS FOR FUSION



MAGNETS FOR HIGH ENERGY PHYSICS



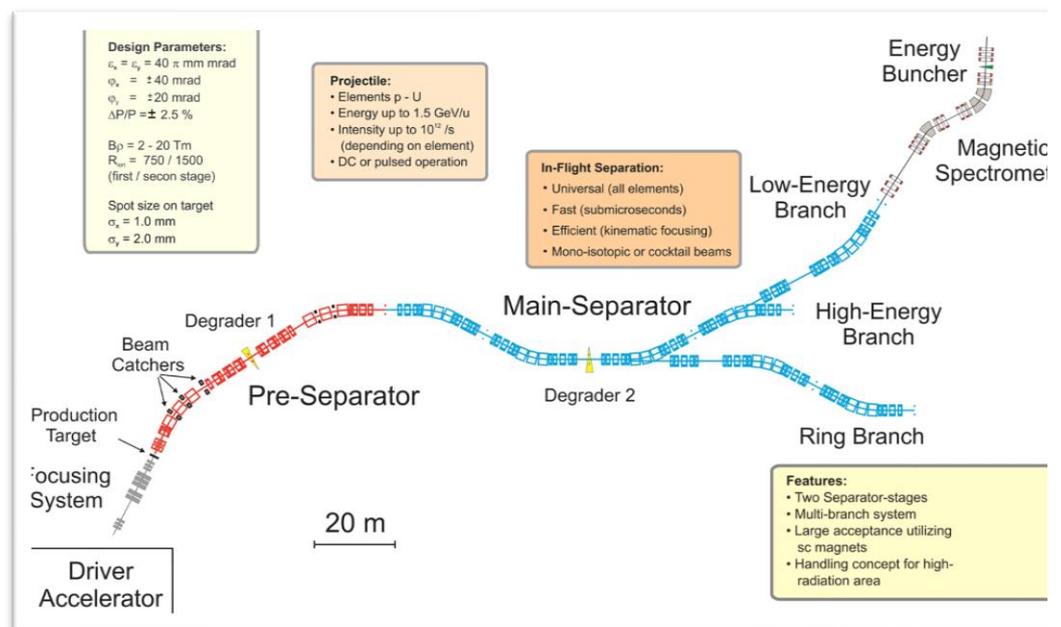
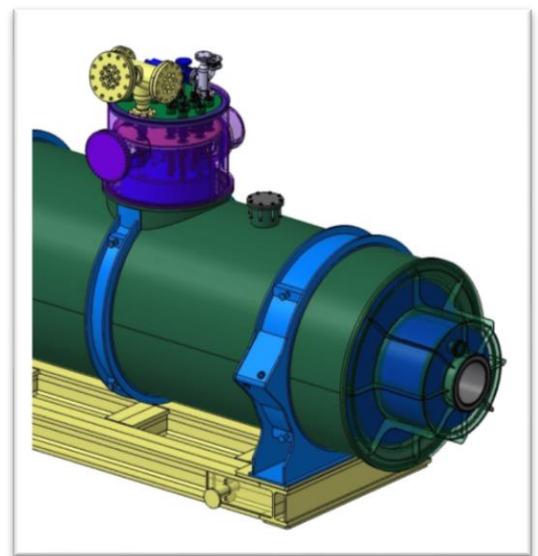
MAGNETS FOR MEDICAL APPLICATIONS



SYSTEMS FOR ENERGY



SERVICES & REPAIRS





MAGNETS FOR FUSION



MAGNETS FOR HIGH ENERGY PHYSICS



MAGNETS FOR MEDICAL APPLICATIONS

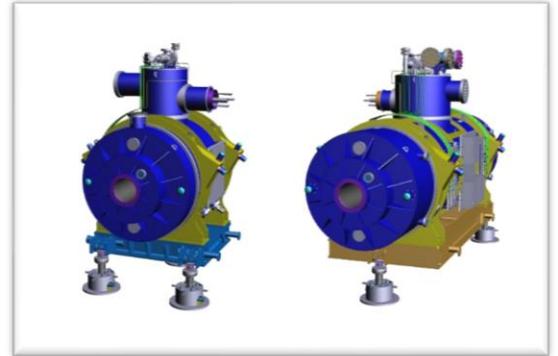


SYSTEMS FOR ENERGY



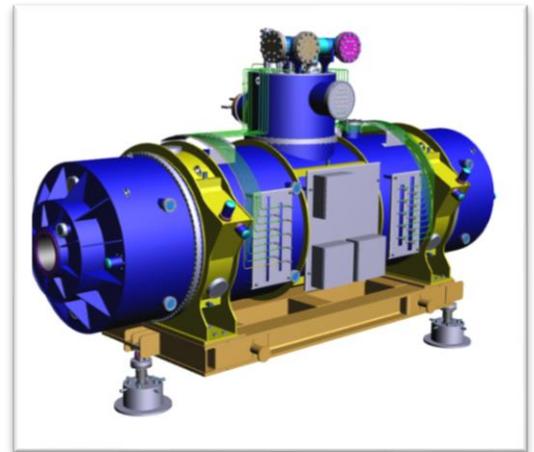
SERVICES & REPAIRS

- 24 long multiplets + 9 short multiplets
- Cold, laminated iron yoke (>40 tons) (long multiplet)
- Warm beam pipe (38 cm inner diameter)
- Common helium bath (~1300 liter helium) (long multiplet)
- 1 pair of current leads per magnet
- Max. current <300 A for all magnets



SHORT MULTIPLET

LONG MULTIPLET



Lenght From 2 to 2,7 m (depending on magnets configuration)

Weight ~ 25 tons

Lenght From 5,6 to 7,0 m (depending on magnets configuration)

Weight ~ 60 tons

MAGNET PARAMETERS

	SHORT QUADRUPOLE with embedded octupole	LONG QUADRUPOLE	SEXTUPOLE	STEERING DIPOLE
Number of Magnets	44 + 2(*)	34	41	14 (13v/1h)
Effective length	0.8 m	1.2 m	0.5 m	0.5 m
Gradient/ Field Range	1.0-10 T/m	1.0-10 T/m	4-40 T/m ²	0-0.2 T
jgdl	0.8-8 T/m*m	1.2-12 T/m*m	2-20 T/m ² *m	≥ ± 0.1 T*m
Field Quality	For g < 0.8 g _{max} ±1·10 ⁻³ For g > 0.8 g _{max} ±6·10 ⁻³	For g < 0.8 g _{max} ±1·10 ⁻³ For g > 0.8 g _{max} ±6·10 ⁻³	±5·10 ⁻³	±8·10 ⁻³
Usable aperture	Ø 380 mm	Ø 380 mm	Ø 380 mm	Ø 380 mm

(*) 2 units without octupole

SHORT MULTIPLET ASSEMBLY



MAGNETS
FOR FUSION



MAGNETS FOR HIGH
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MAGNETS FOR
MEDICAL
APPLICATIONS



SYSTEMS
FOR ENERGY



SERVICES & REPAIRS



Cold Mass Assembly



LHE Vessel Assembly



Vacuum Chamber Assembly

