

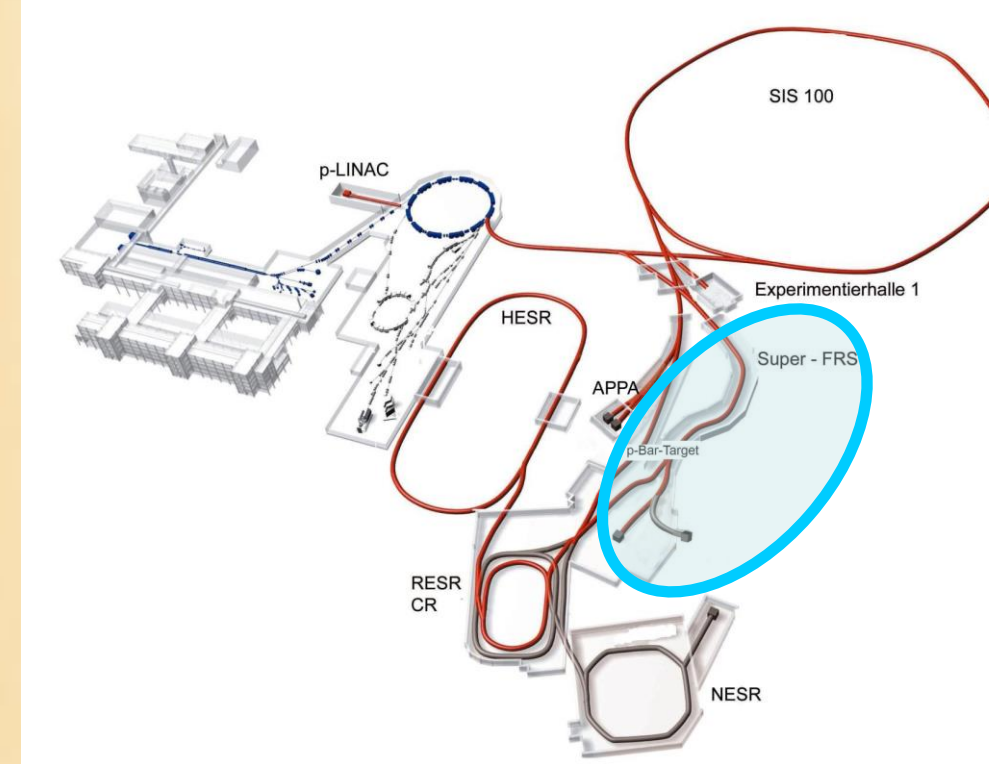
Radiation resistant magnets for the Super-FRS of the FAIR project

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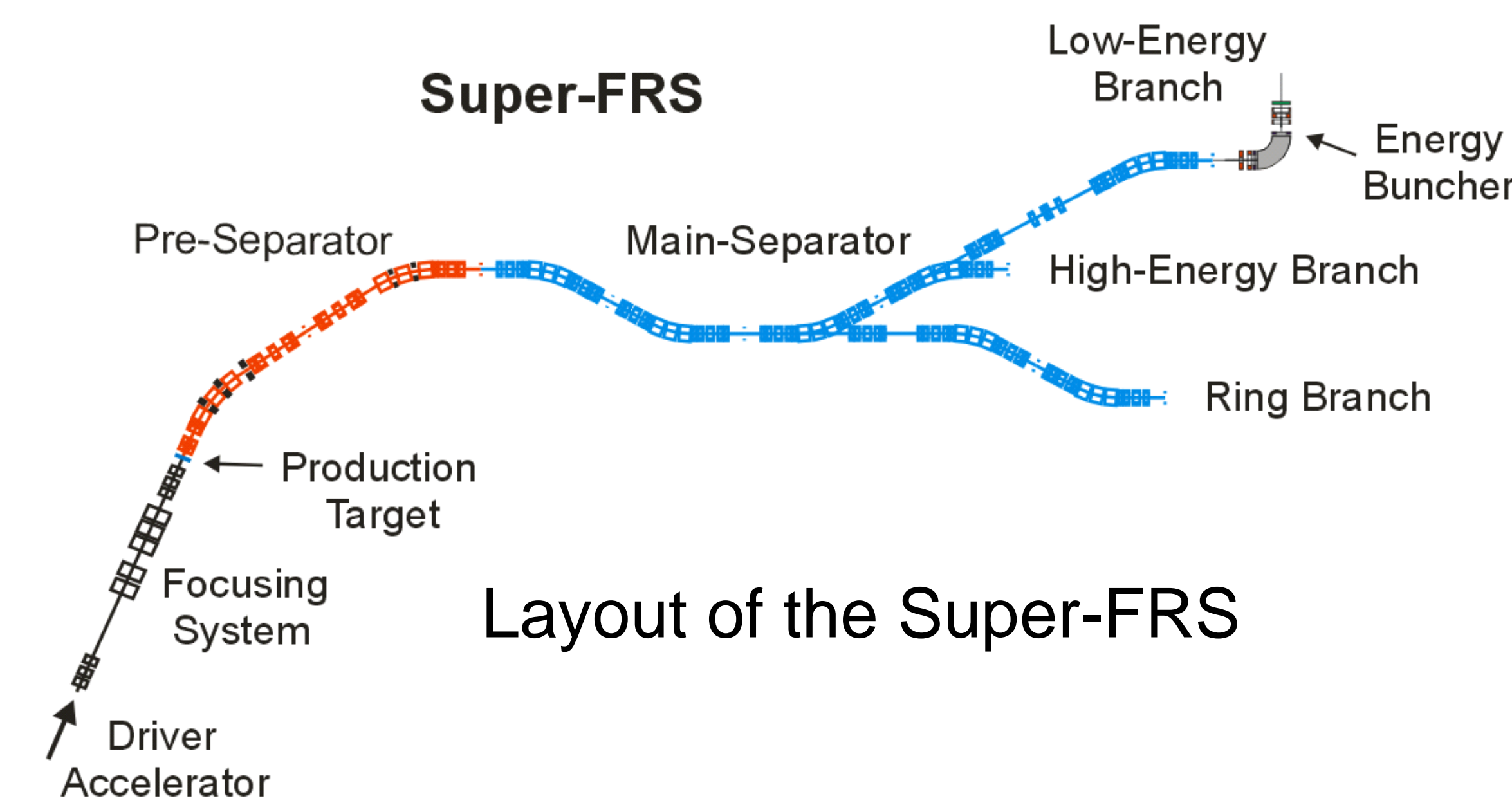


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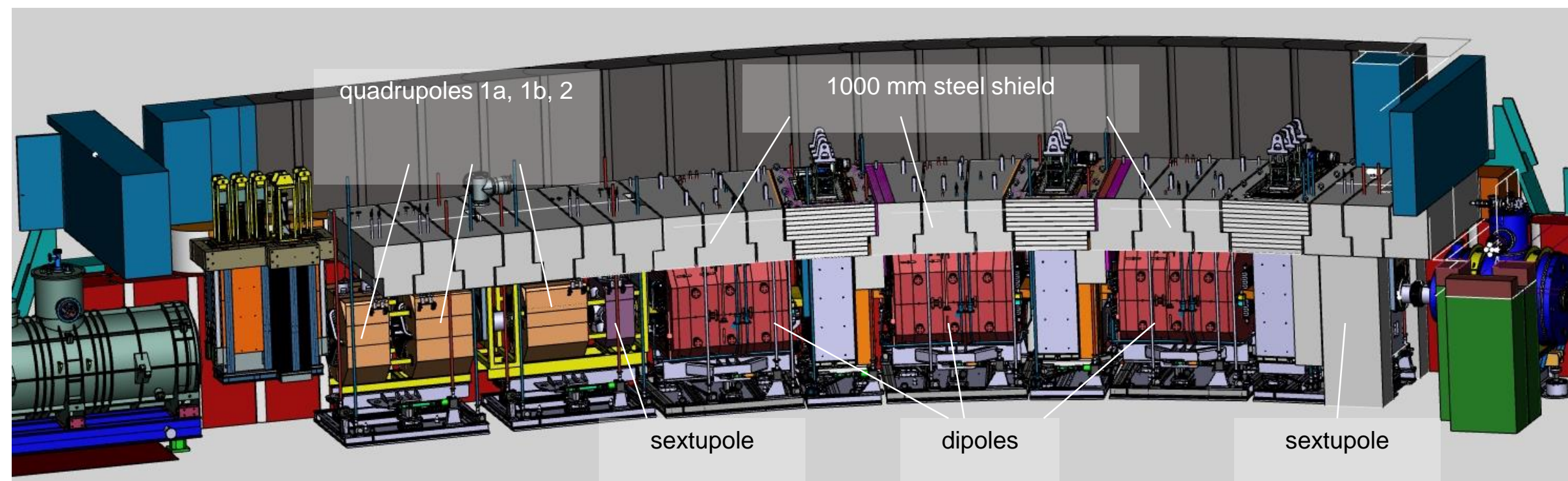


Main Magnet Parameters

magnet typ	units	min. field strength	max. field strength	effective length (m)	good field region (mm)	field quality	current	DC power	inductance	weight	l×w×h (m)
Dipole	3	0.15 T	1.6 T	2.400	400 × 140	$\pm 3 \cdot 10^{-4}$	640 A	140 kW	2100 mH	90000 kg	3.1×2.8×1.8
Quadrupole 1a	1	1.6 T/m	15.4 T/m	0.933	∅ 130	$\pm 1 \cdot 10^{-3}$	981 A	47 kW	4.5 mH	16800 kg	1.2×1.8×1.8
Quadrupole 1b	1	1.2 T/m	11.8 T/m	1.244	∅ 180	$\pm 1 \cdot 10^{-3}$	1400 A	116 kW	4.75 mH	22200 kg	1.5×1.6×1.6
Quadrupole 2	1	0.6 T/m	6.1 T/m	1.200	380 × 240	$\pm 1 \cdot 10^{-3}$	1800 A	205 kW	61 mH	19000 kg	1.5×1.6×1.6
Sextupole	2	3.5 T/m ²	34 T/m ²	0.600	∅ 380	$\pm 5 \cdot 10^{-3}$	1800 A	90 kW	18.3 mH	5000 kg	0.84×1.6×1.6



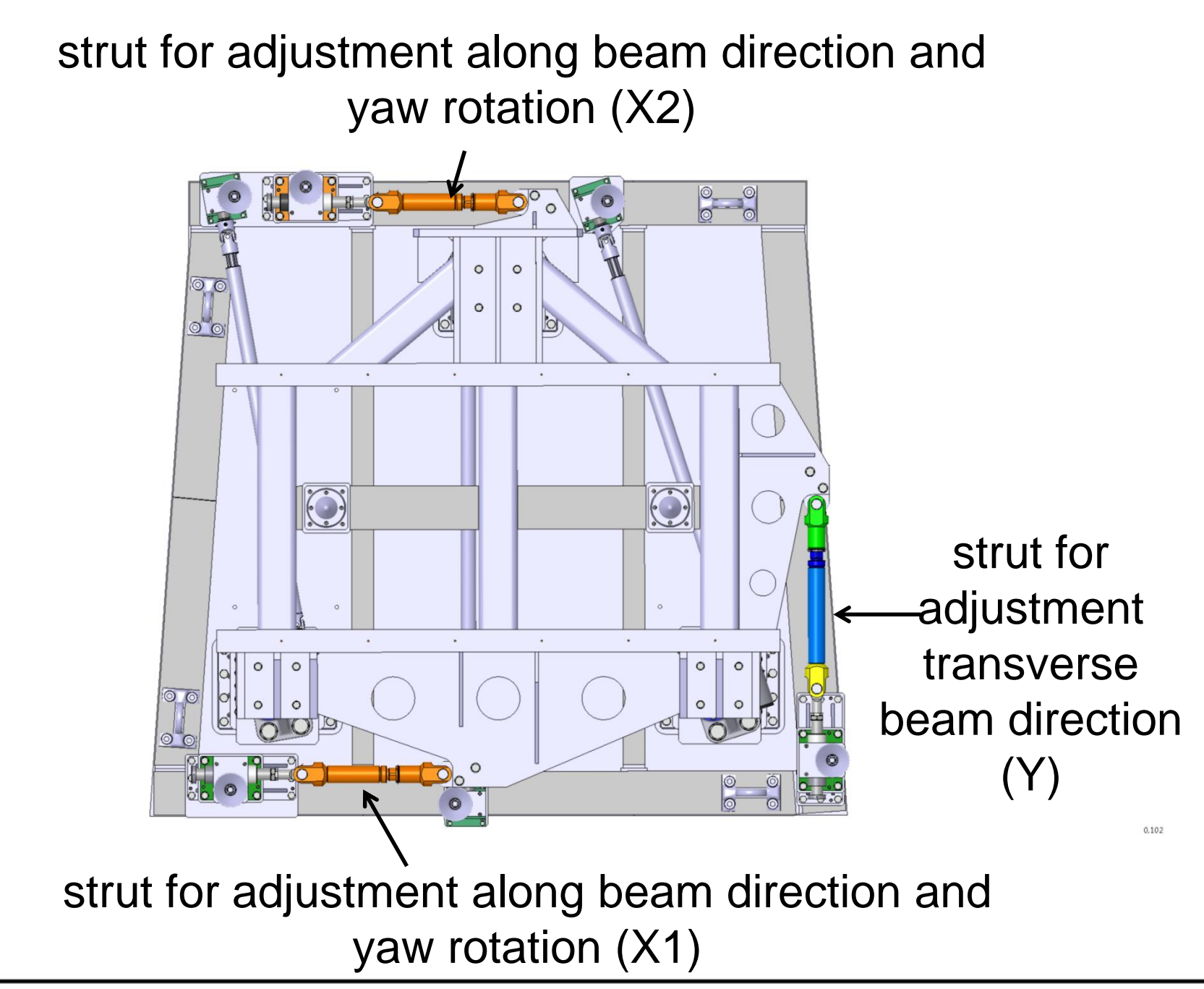
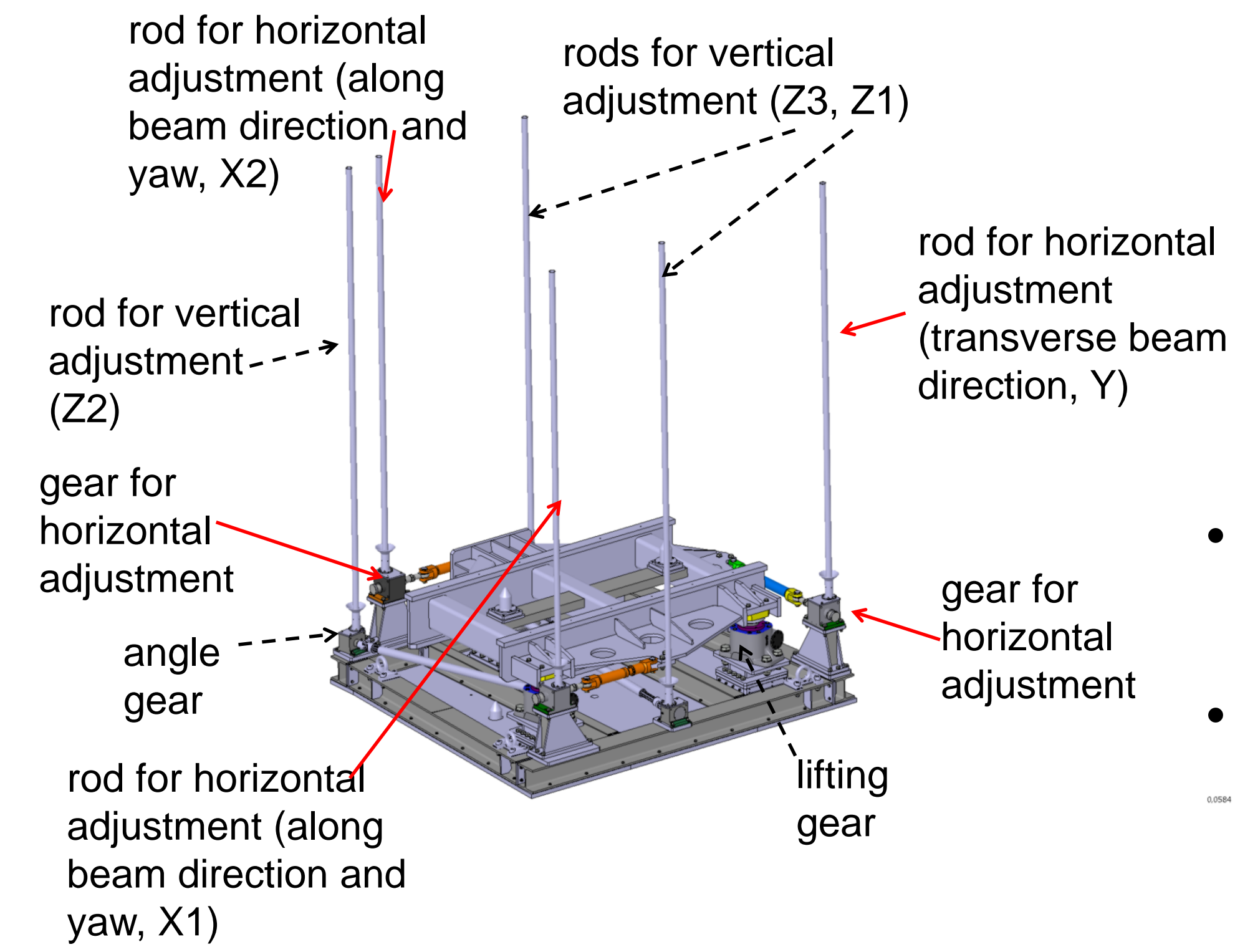
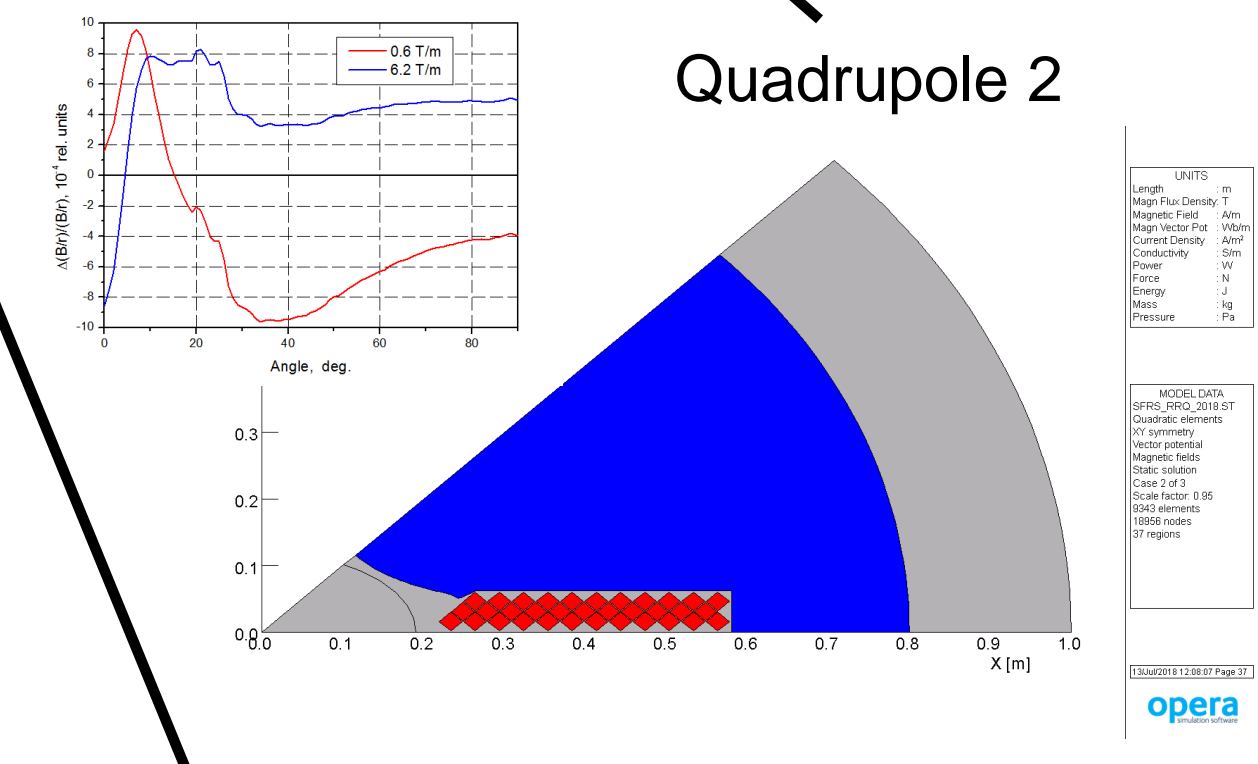
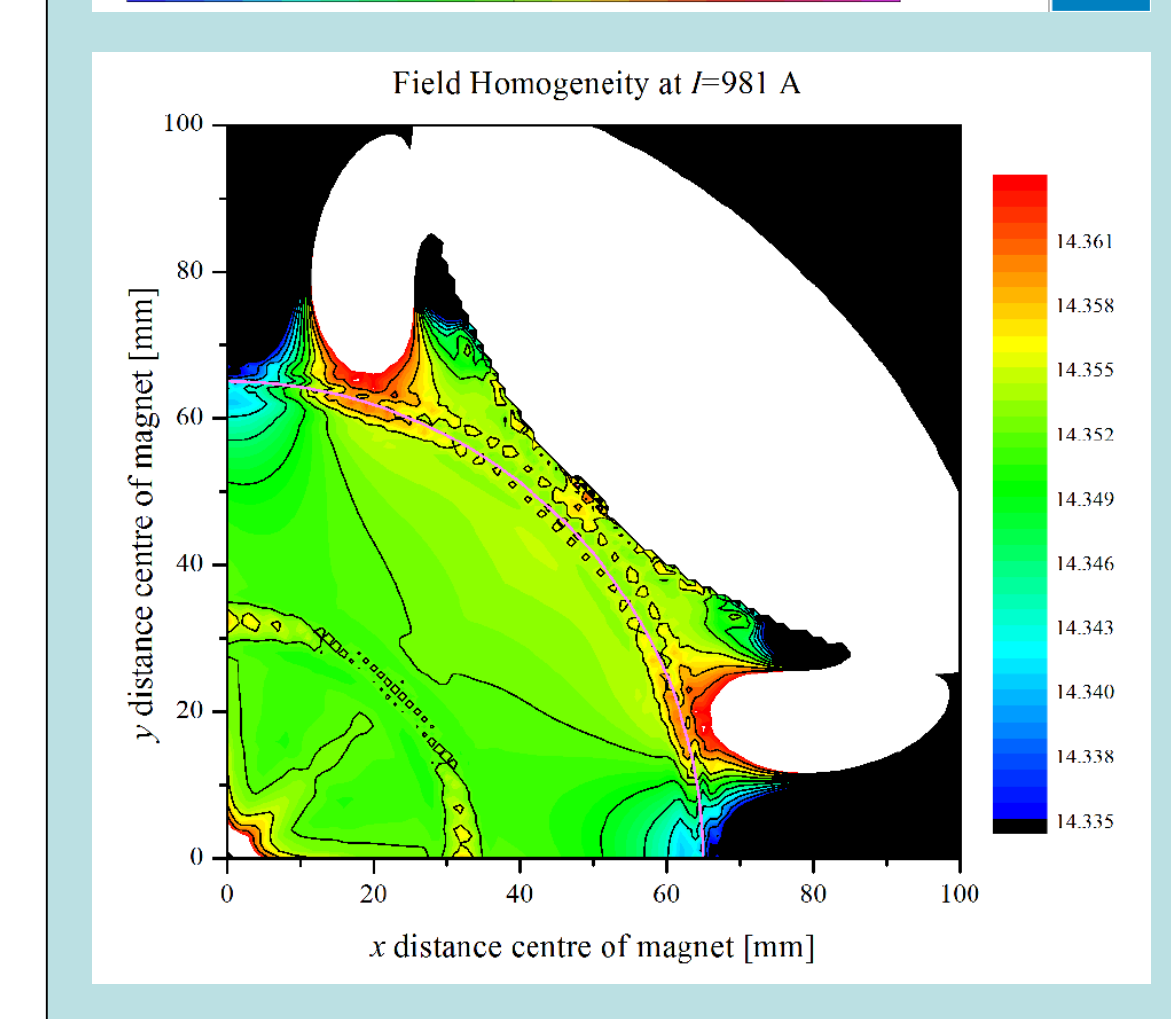
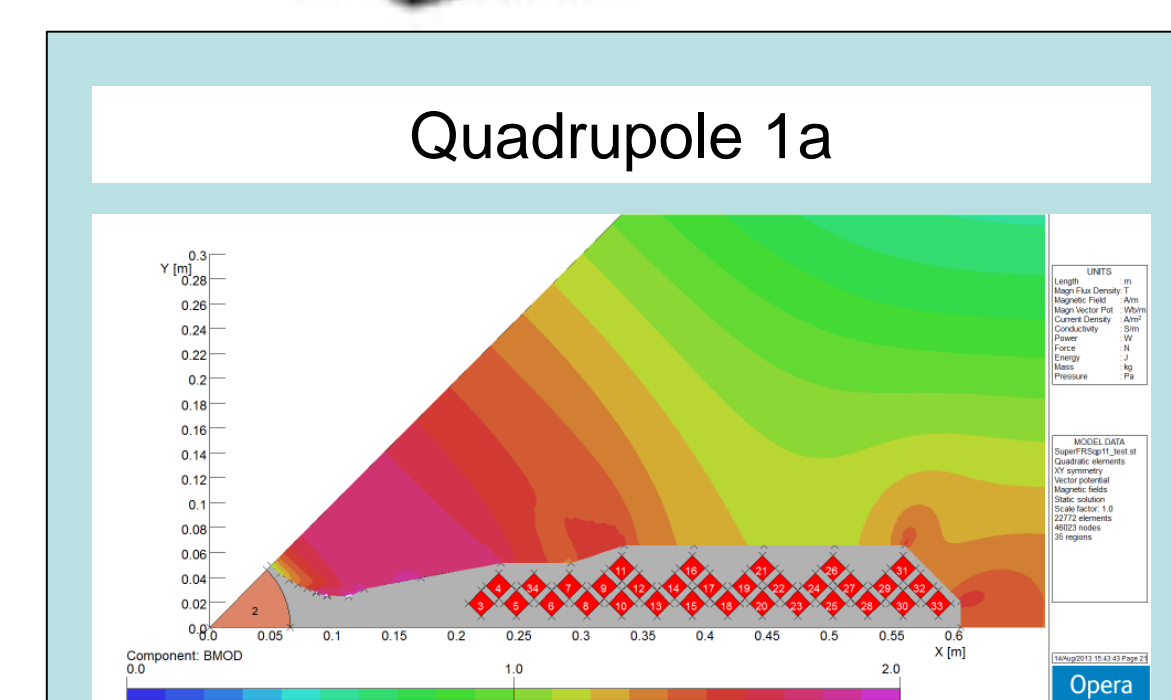
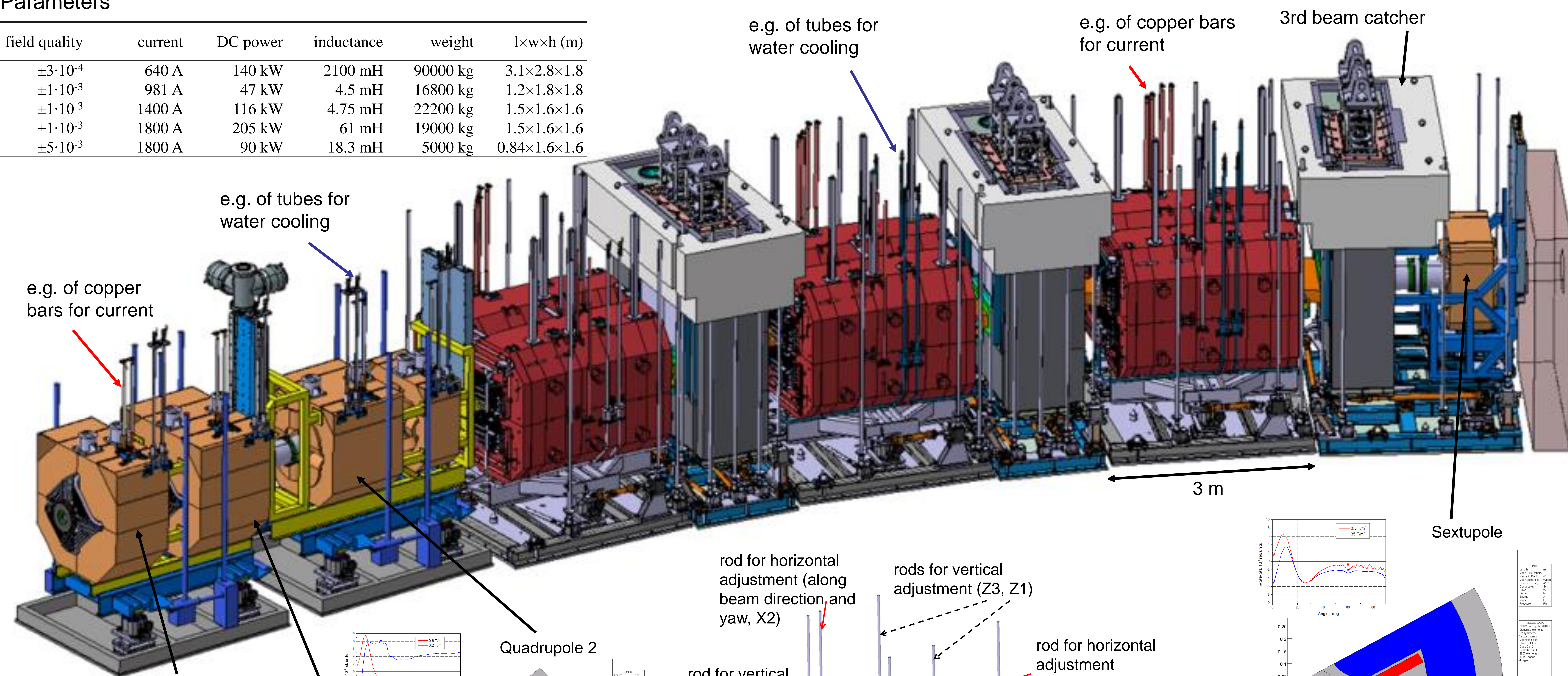
Radiation resistant magnets in the pre-separator surround by shielding. A service tunnel is above the 1000 mm steel shield.



Dipoles

Dipole coil manufacture

Dipole yoke manufacture



- One dipole already exists. Two further dipoles are ordered
- New adjustable support frame for the dipoles. Horizontal adjustment is based on a 3-strut system. Successful test => same type of support frame for all other magnets and beam catchers
- Connections for water cooling and electrical current have been successfully tested one month at full power.
- All three quadrupoles have a different design. Special coil configurations are required.