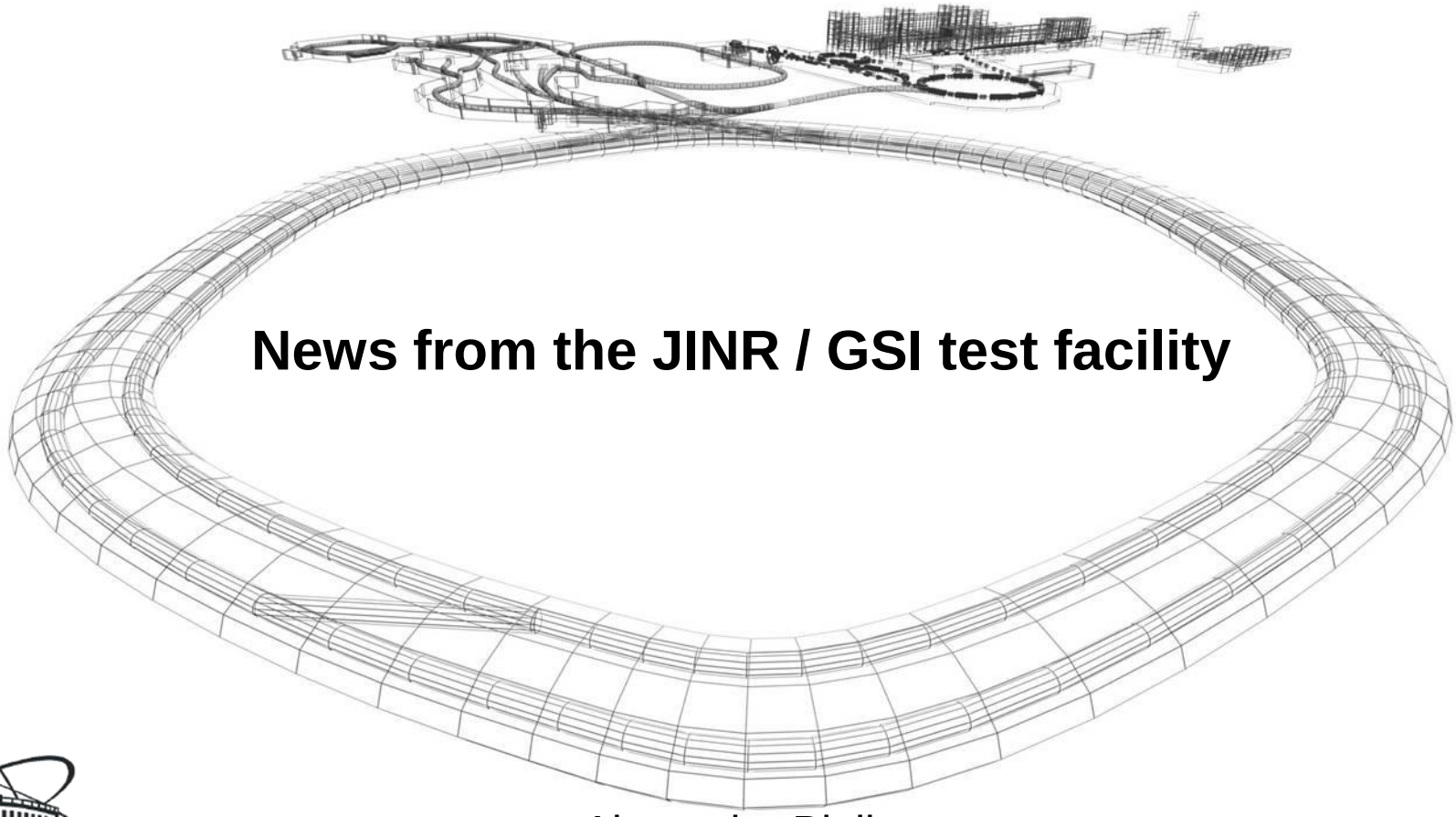
News from the JINR / GSI test facility



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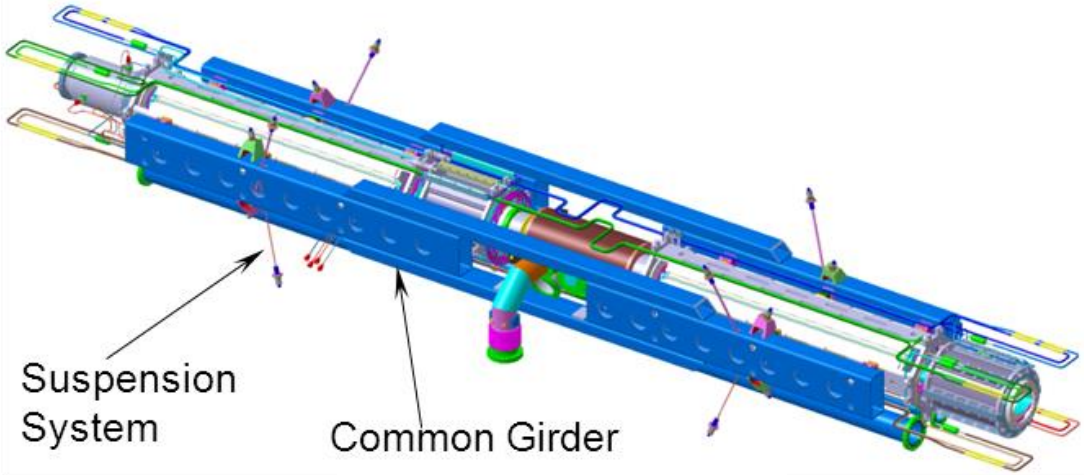
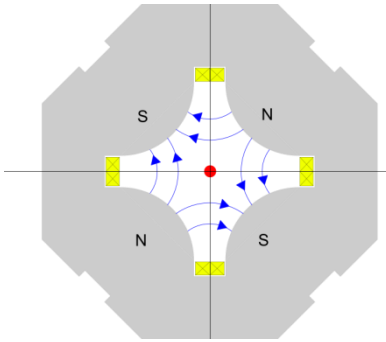
JINR / GSI Magnet Test Facility

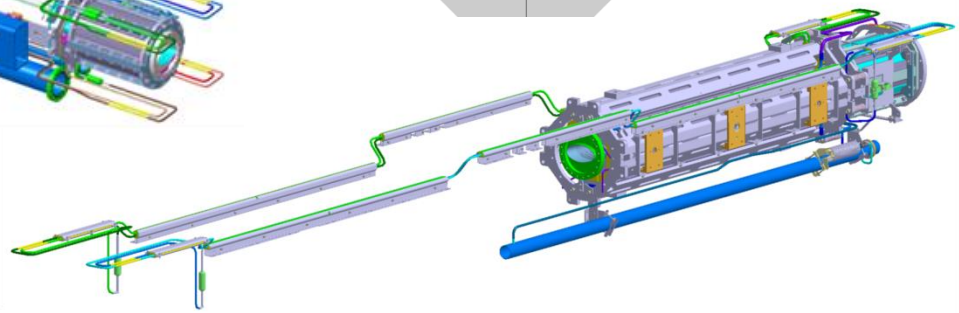
scope:

- testing of superconducting magnets for NICA project:
  - 40 booster dipoles
  - 48 booster quadrupoles
  - 80 + 8 collider dipoles
  - 86 + 12 collider quadrupoles
- testing quadrupole units for SIS100 synchrotron:
  - 166 + 3 main quadrupole magnets in combination with:
    - sextupole magnets
    - steering magnets
    - multipole correctors
    - gt-jump quadrupoles

Fast ramping magnets for NICA and for SIS100

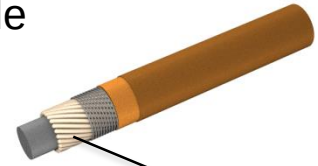


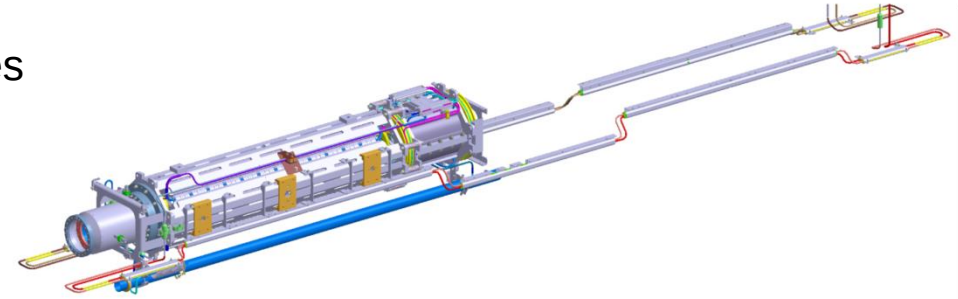




Nuclotron cable
I_{nom} = 10.5 kA

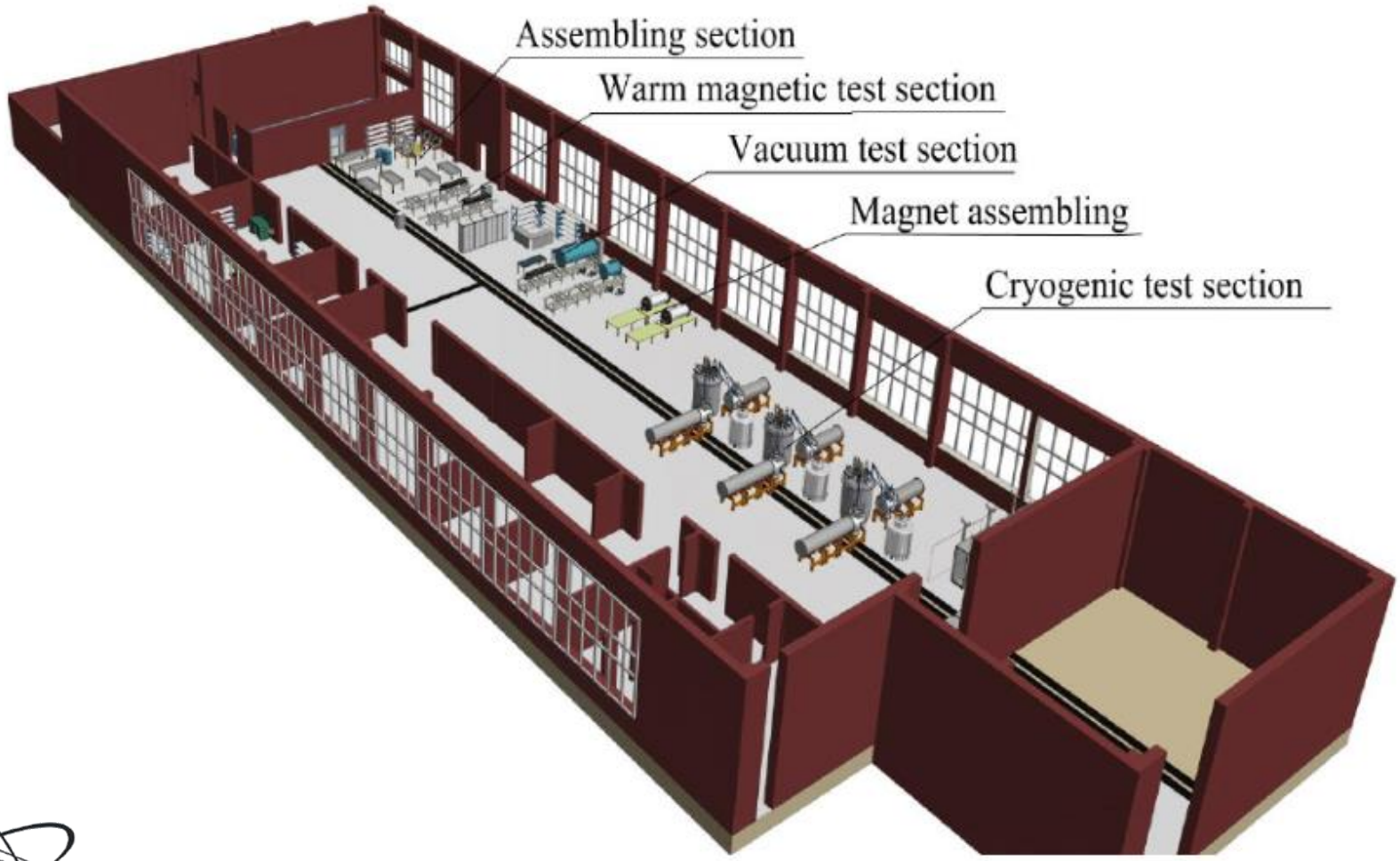
cooling tube
D_i = 4.7 mm





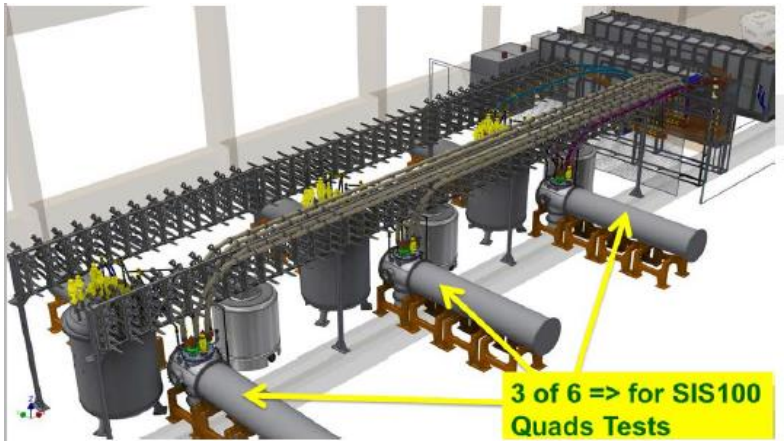
Fast ramping magnets for NICA and for SIS100

Testing hall



Testing hall

Testing hall



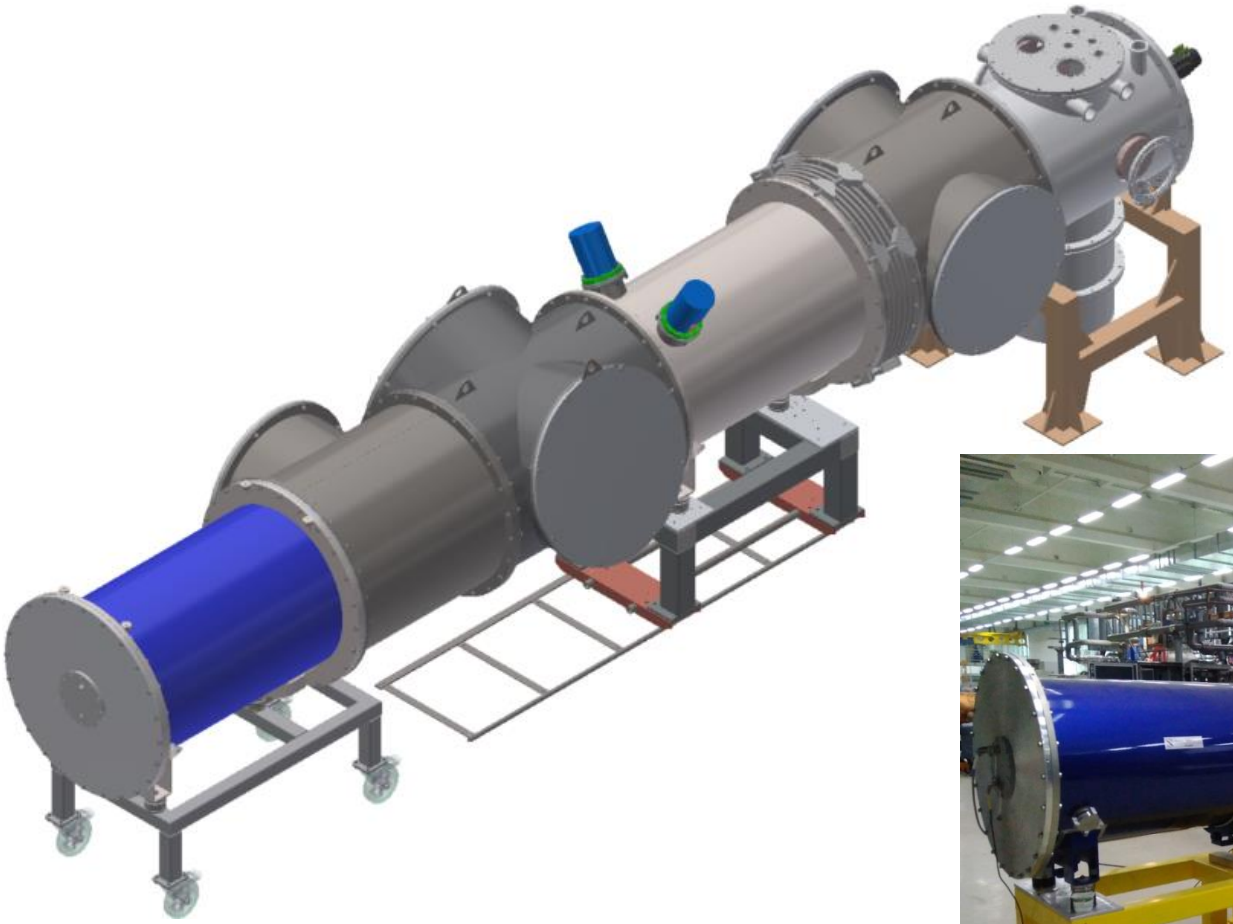
- 3 x 100 W satellite refrigerators
- 6 feed boxes with 18 kA current leads
- 2 power converters 15 kA 25 V
- „cold“ magnetic measurement systems

Test program

Test program:

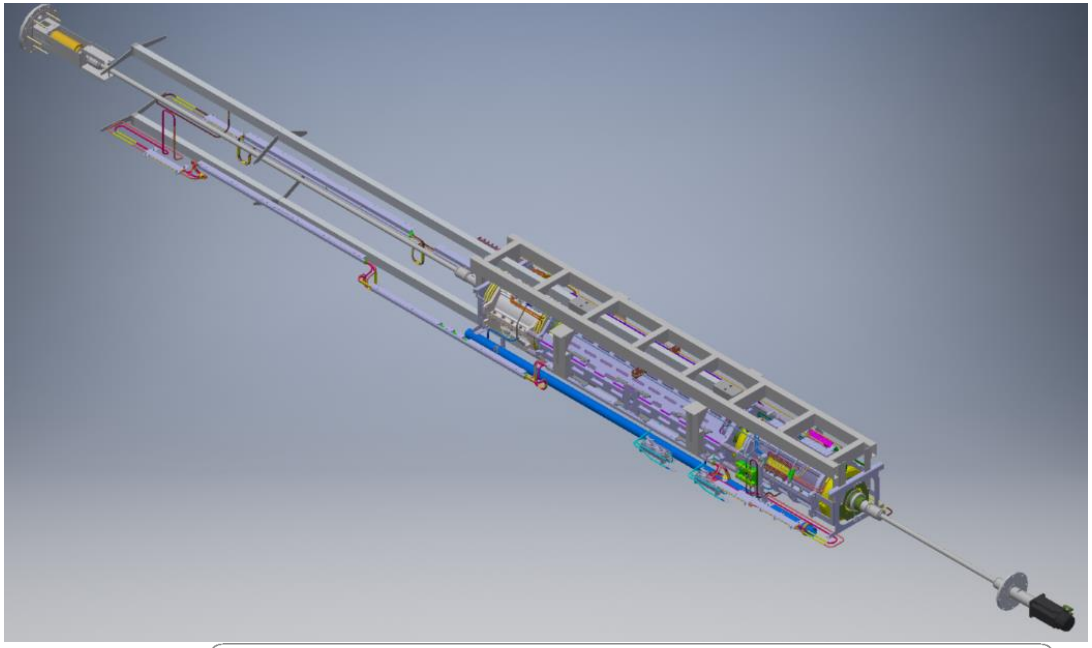
- warm tests: magnetic measurements, electrical tests, leak tests
- cool down (about 50 – 70 hrs)
- check of instrumentation (sensors, v-taps), HV tests, leak tests
- training of the main quadrupole and correctors
- magnetic field measurements
- ramping reference cycles, dynamic heat losses, pressure drop
- warming up and warm tests

Testing cryostat



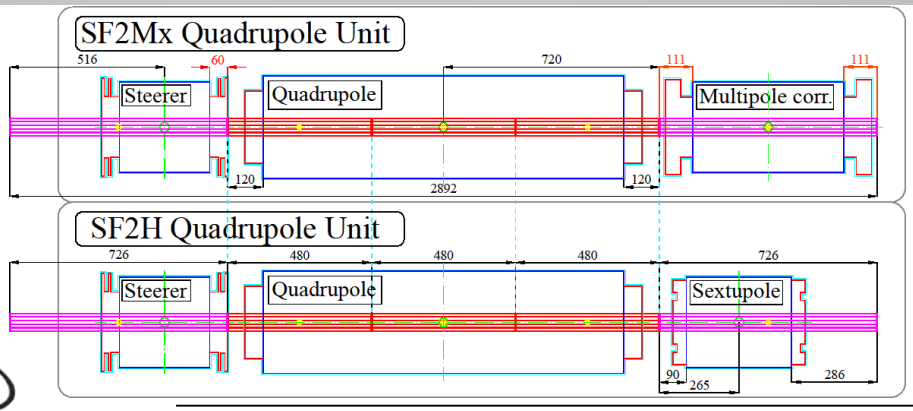
Magnetic field measurements

field integral, harmonics, position of axis



<u>cold rotating coil probe</u>

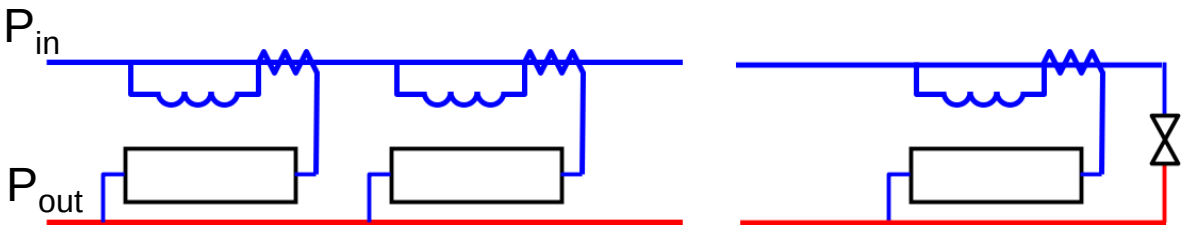
main quadrupole
chromaticity sextupole
steerer
nested multipole corrector

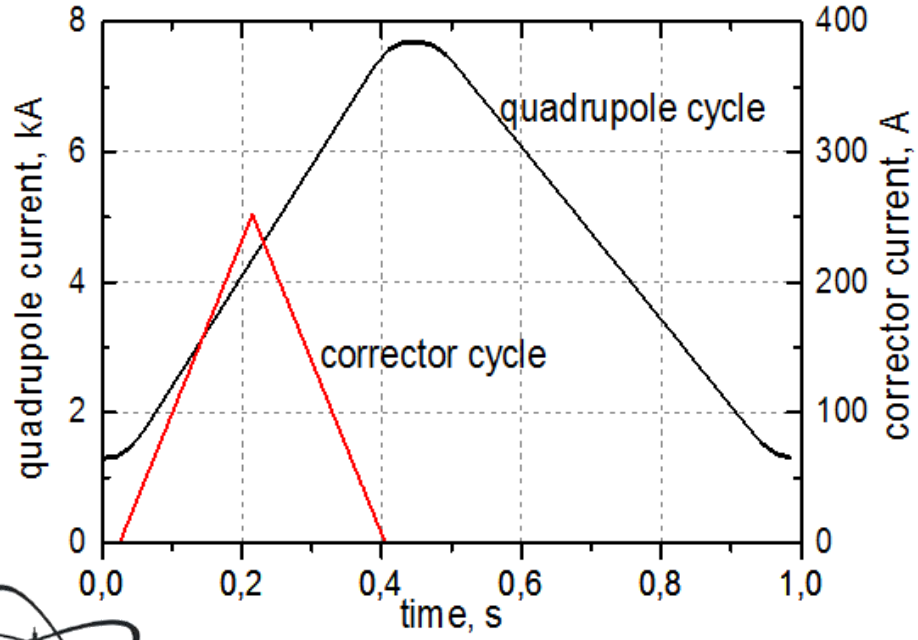


3 PCB: 5 coils × 480 × 13 mm² for the main quadrupole

2 PCB: 5 coils × 726 × 13 mm² for correctors

Hydraulic adjustment





P_{in} = 1.5 – 1.8 bar
T_{in} = 4.5 K (sub-cooled)
P_{out} = 1.25 bar, two-phase

<u>Heat load:</u>

static:	< 5 W
dynamic:	up to 20 W

Summary and outlook

- A facility for testing superconducting magnets for FAIR and for NICA has been put into operation in 2017
- Testing of magnets for the NICA booster is completed, testing of collider magnets has started
- two pre-series quadrupole units for SIS100 have been tested
- testing of series quadrupole units will start in July 2019