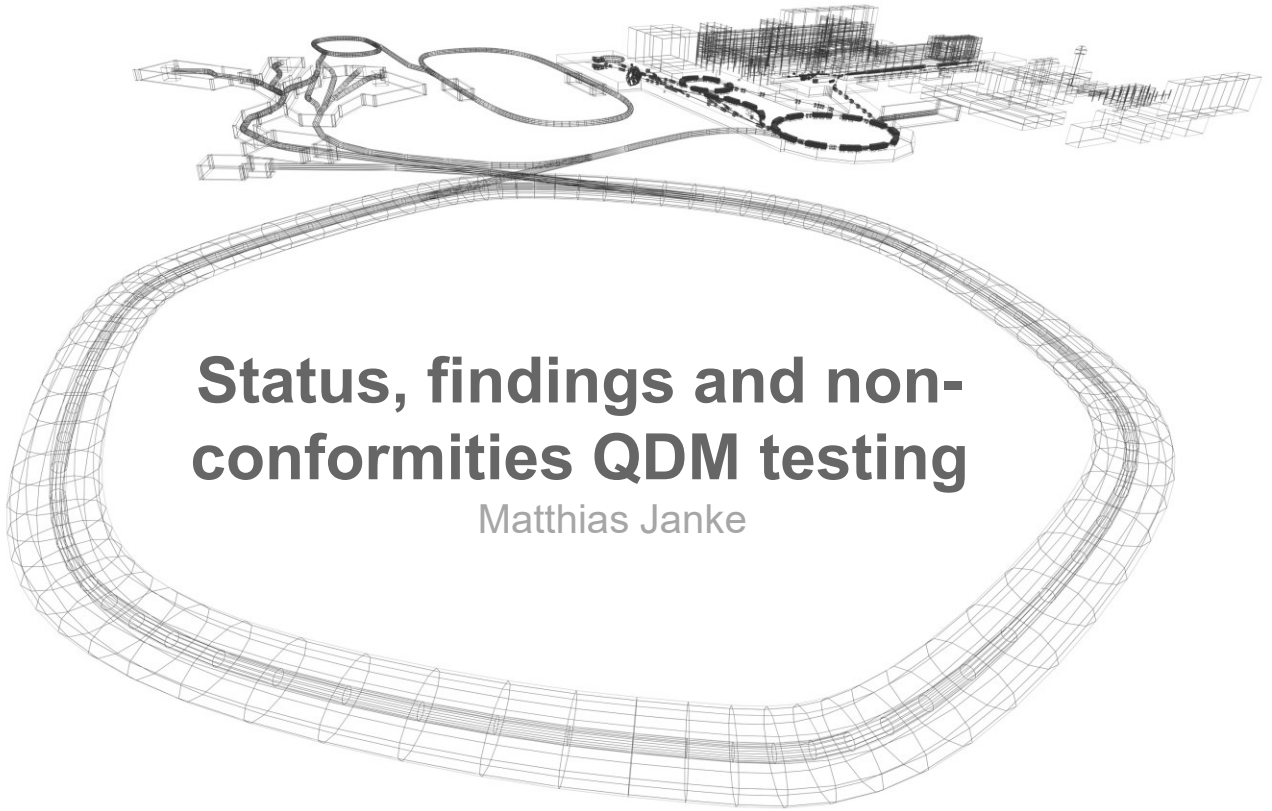


Status, findings and non-conformities QDM testing

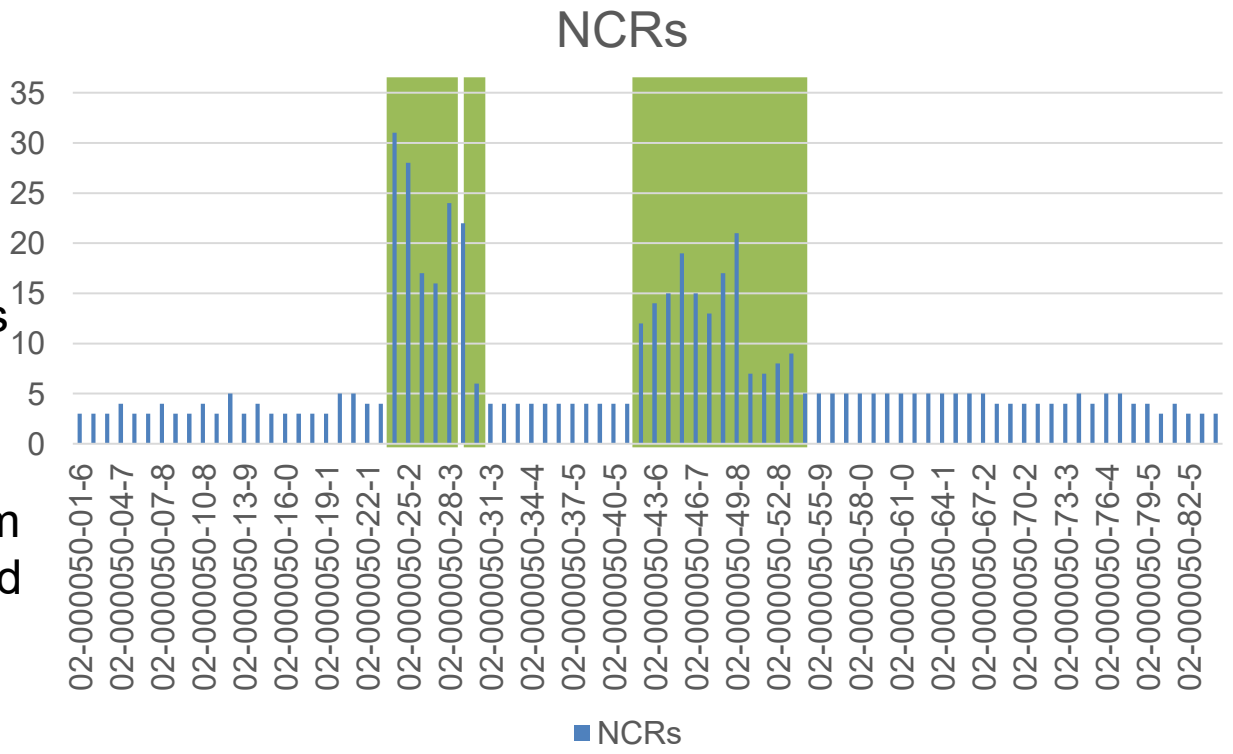
Matthias Janke

Statistics

- 18 of 83 QDM delivered
- 10 QDM in production
- 1006 individual NCRs
- incl. VC, COL, QPU
- NCRs affect whole series
- 14 critical topics tracked

- Issues with solutions from last year are implemented

- only issues with new developments in this talk.



Issue Classes

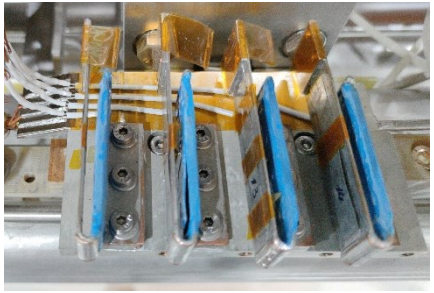
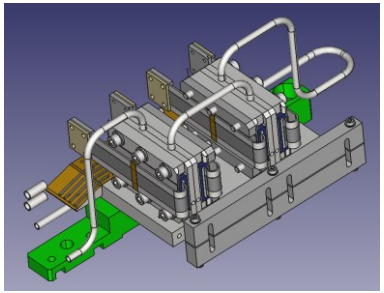
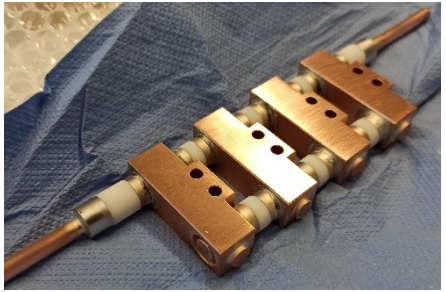
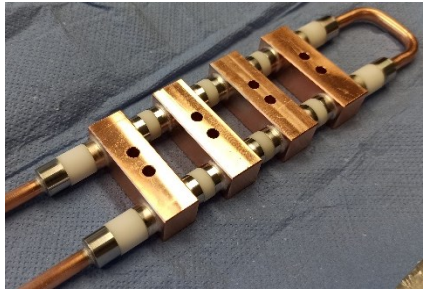
- Reoccurring Issues
  - issues that affect multiple modules and need broader treatment
- Design Modifications
  - issues that can be avoided by modifying the design
- Issues under investigation
  - issues that might arise if not closely monitored/further investigated
- Random Issues
  - singular mishaps
- Raw Materials procurement
  - deviations from specified Materials due to market availability

Issues under investigation

- UHV leaks at interface between BPM & VC
  - 4 BQD Units affected
  - difficult to diagnose due to limited access
  - parts from 3 different manufacturers involved
  - currently under investigation
  - possible solution: more spare parts for quick exchange
- BB-Movement
  - new colleague continued work on that topic
  - thorough inspection of new QPUs shows significant random deviations from drawings
  - unknown state of 18 QDMs
  - risk of higher quench rate and fatigue of material in operation

Issues under investigation

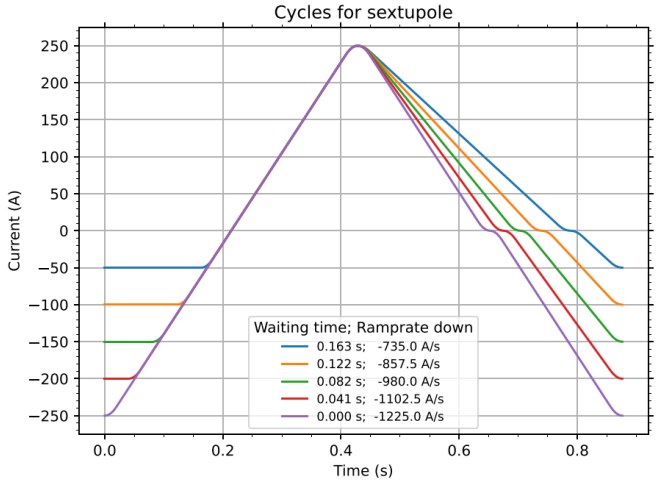
- HV-insulation failure of cold terminals (CTs)
  - hand made pre series CTs had high failure rate
  - solved by exchange with series CTs
  - series CT show high failure rate @ JINR
  - suspected aging or environmental conditions
  - no clear picture yet, no final strategy
  - prepared 2 mitigation designs and 1 complete new CT Design all currently under evaluation
  - cost ~65 k€ (4 QDM) + ~29k€ (18 CTs) + ~9k€ (CT Prototype) + ~10 k€ (2 Mitigations)

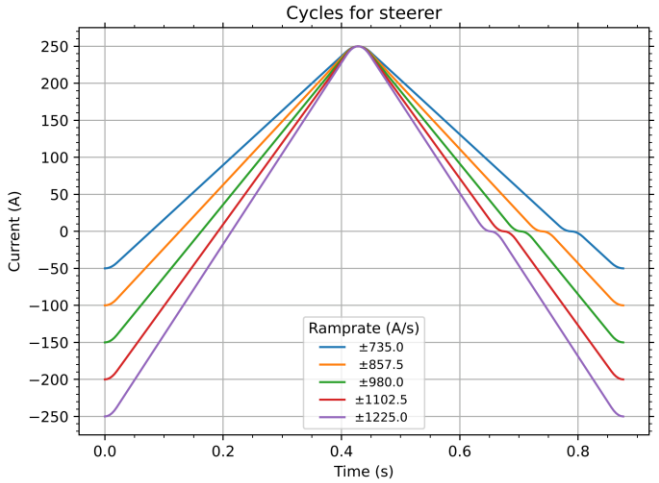





Issues under investigation

- Crosstalk GTJ vs QP
  - quench simulations need to be verified
  - depends on availabilty of magnets
  - setup needs to be assembled
  - testing alongside testing of BNET36 QPUs
- Sextupole thermally fragile
  - two Sextupoles quenched when additional windows were present
  - additional cooldowns for checks necessary
  - possible implication for BNET36 QPUs & cable
- Steerer in QDM #50 lost ramping capability
  - steerer does reach only 600 A/s in unipolar mode
  - worked as expected at JINR

Power ramping bipolar (performed only at STE)

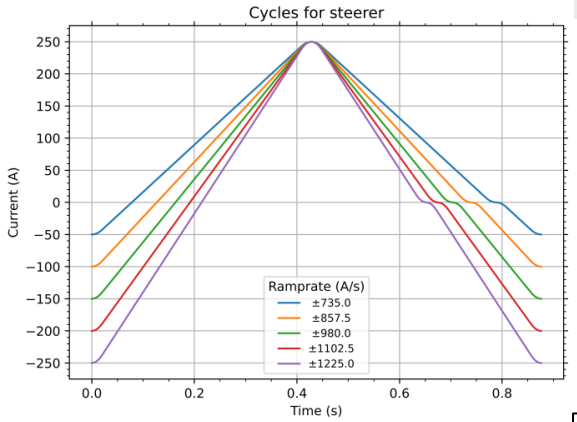


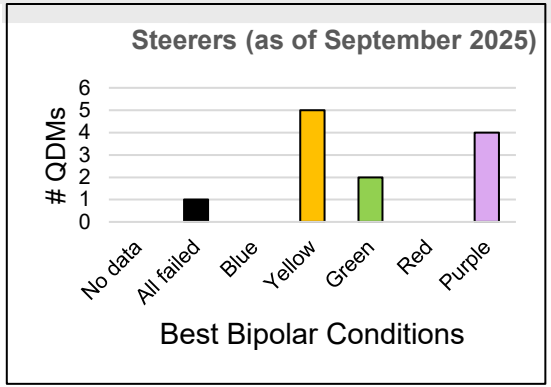


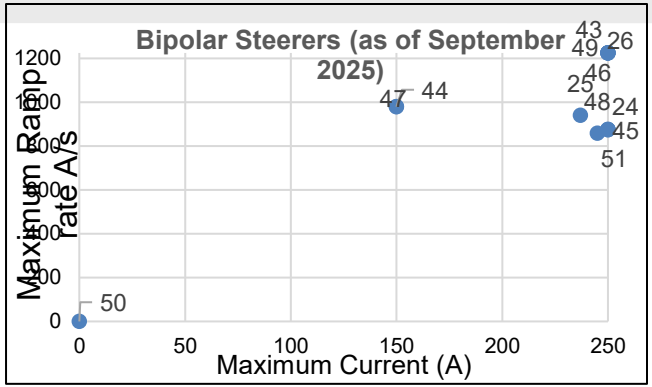
QDM	Chr. Sext.		SV		SH		Quenching coil
	Unipolar	Bipolar	Unipolar	Bipolar	Unipolar	Bipolar	
24		sp.c.					SH
25	ND	ND					SH mostly
26							
27	NT	NT	NT	NT	NT	NT	
28		NT		NT		NT	
29*							
42	NT	NT	NT	NT	NT	NT	
43							
44							SH
45							SH
46							
47	1100 A/s						SH
48	NT	NT					SV
49	NT	NT					
50			600 A/s		600 A/s		SH
51 1thc							SH
51 2thc					600 A/s *1225 A/s		SH

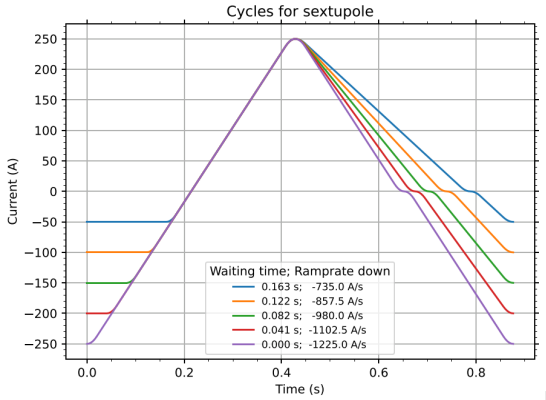
NT- not tested
ND –no data
*1225 A/s – only after curing cycle
sp.c –special cycle 50A /-250A ±1225A/s

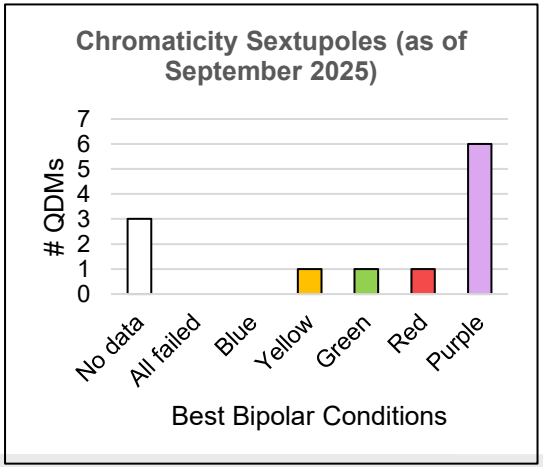
Power ramping bipolar (performed only at STF)

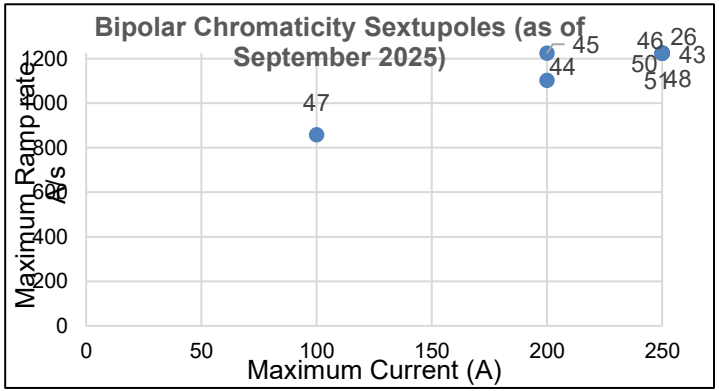












Summary

- No QDM without NCR
- Good progress from last year, all solutions that were dependent on budget implemented
- multiple critical issues still under investigation
- much more effort (people, facilities & time) is needed to develop solutions for current issues
- 65 QDMs to come
- BNET36 QPUs with new cable design might bring unexpected surprises
- NCRs increases workload on QDM personnel