

2016-12-06 HiLumi LHC Planning

16 November 2016

18:57

Proposal for special FREIA meeting

- Wednesday 7 December 14:00
- Ångström A82114 (Acquarium)

Contract between UU and CERN:

- test of up to 20 dipole corrector magnets in Gersemi
 - start in 2018, end 2020
- test of 1 or 2 crab cavities in HNOSS and up to 10 in Gersemi
 - start in 2018, end 2020

Main interest for UU/FREIA

- new vertical cryostat "Gersemi"
- knowledge on superconducting magnets
- study of the quench behaviour of crab cavities
- study of LHC machine safety
- anything else???
 - ...

Planning

- planning
 - take into consideration ongoing projects
 - ESS
 - cold DC spark
 - solid-state RF
 - work
 - space usage
 - preparation of inserts
 - power converters
- knowledge transfer from CERN
 - person(s) to spend time at CERN to learn about magnet test
 - how about crab cavity?

Design work

- support for vertical cryostat inserts
- support ring for the vertical cryostat (around the vertical hole)
- concrete shielding of the vertical cryostat for cavity testing
- magnet circuits (2x 2 kA)
- small coil for earth magnetic field correction around the vertical cryostat

Equipment to be ready before end 2017

- Cryostat
 - vertical cryostat
 - under manufacturing by Cryo Diffusion
 - two pairs of current leads

- Magnet testing
 - magnet powering circuit
 - two power converters and energy extraction units (through CERN)
 - 2 kA, bipolar, 4 quadrant
 - ramp rate up to 20 A/s
 - ◆ see slide #9
<https://indico.cern.ch/event/549979/contributions/2263200/attachments/1371411/2080300/powerConverterRequirementsV5.pdf>
 - ◆ see slide #10
https://indico.cern.ch/event/549979/contributions/2263233/attachments/1371365/2080053/2016-11-15-HL_LHC_Update_On_Powering_Of_Inner_Triplet_CircuitsV1.pdf
 - parallel connection of 4 quadrant 400 A units
 - 5+1 unit redundancy
 - ◆ see slide #4
https://indico.cern.ch/event/549979/contributions/2257136/attachments/1372329/2083548/WP6B_Recent_changes_in_the_H_L-LHC_powering_Animated_Short.pdf
 - magnet quench heaters
 - to be defined
 - mega-ohm meter ("Megger")
 - up to 3 kV high voltage to ground test
 - commercial equipment, to be ordered
 - "fast" measurement system (through CERN)
 - quench detection system
 - see presentation
https://indico.cern.ch/event/549979/contributions/2295248/attachments/1370412/2078175/HL_PARIS_2016_rd.pdf
 - including voltage tap measurement
 - "slow" measurement system (design from CERN)
 - temperature, strain, position, B-field
 - MM, RRR, L, Splice, HV
- Crab Cavity Testing
 - RF station for 400 MHz
 - adaptation CERN tetrode station (exchange of cavity)
 - LLRF for 400 MHz
 - self excited loop
 - possibly control loop with cavity tuning system