COMPASS Polarized Target

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1. New man power

CERN: Rieublands group LHC/ECR/Cryolab (Laetitia Dufay, Tino Vacca ...) $\times$ 3 months

Bielefeld: Fabrice Gautheron (slow control)

Bochum: Stefan Goertz (NMR)

2. Meetings

- safety meeting at CERN 25th October
- at Tubney Woods 11th December
- with Rieubland and Niinikoski 18th December
- polarized target meeting at CERN next week

3. Planning, time lines and mile stones

Technical preparation

4. Platform preparation

- helium recovery lines ready from platform to Jura wall
- cable trays mostly installed
- cooling water system ready (check demineralised supply)
- pumping lines to cryostat
- mounting of cryostat without magnet

5. Cryogenic services LHe and LN_2

- waiting LN_2 transfer line, valve box, control system
- LHe valve box to Saleve side
- LHe control system, signals

Technical preparation

6. Pump room

- roots blowers o-rings changed, switched on/off to check rotation direction, leak testing being done, purging of roots blowers
- ^{4}He pumping and ^{3}He return lines leak tested
- ^{4}He pumping system missing low voltage control electricity connections, leak testing and running pumps
- helium inventory and mixture pump installation and testing
- welding of missing lines

Field mapping

- safety ± 4.5 m along beam axis, ± 3.15 m vertical and ± 5 m in lateral direction, grid 20 cm
- offline ± 4.5 m beam, ± 1.5 m vertical , ± 1.5 m lateral, grid 4 cm
- field mapping inside magnet at OIS (grid?)
- at CERN with/without SM1 and trim coil adjustment
- check points outside
- muon beam bending in dipole field

Target material

- ^{6}LiD or NH_3?
- different NMR frequencies for proton and deuterium
- polarization in big volume of COMPASS vs. small samples of Bochum
- is the microwave and NMR hardware suitable for ^{6}LiD?

Safety

CERN Pressure Vessel Code D2

- waiting design file from OIS
- 150 % pressurized at OIS, has to be repeated at CERN

Electrical code C1 and magnetic safety IS36

- discharging of magnet without quench
- field map to define safety perimeter
- warning lights and signs

Magnet reception

- if PSUs and magnet system conform with EU standards the safety officers don't need to do full inspection

Other relevant codes and instructions

A3 Rev.- Safety colors and safety signs, D1 Rev. - Lifting equipment, IS 5 - Emergency stops, IS 23 Rev.2 - Criteria for the selection of electrical cables and equipment with respect to fire safety and radiation resistance, IS 24 -

Safety

Regulations applicable to electrical installations, IS 41 - The use of plastic and other non-metallic materials at CERN with respect to fire safety and radiation resistance, IS 47 - The use of cryogenics fluids

Slow control

1. Hardware level (16 %)

magnet interlocks, cryostat interlocks, to-do full inventory, sanity check and testing

2. Sub-VI level (32 %)

creation of software modules to control each device

3. System level (48 %)

magnet, cryostat, NMR and data buffering operate with computer control

4. Technical run level (64 %)

magnet, cryostat, NMR hardware can be tested and calibrated

5. Target material physics level (80 %)

target material is polarized and its properties understood

6. Physics level (100 %)

Te-calibration, polarization, transition from polarization to frozen spin mode, frozen spin mode, polarization reversal, polarization measurement

Known risks and problems

1. PT-magnet and SM1 interaction

- mechanical stress
- stability superconductivity (induced quenches)

2. PT-magnet and dilution share same isolation vacuum

- leak in cryostat $\Rightarrow$ sudden warm up of magnet and cryostat
- possibility to loose expensive ^{3}He

3. Eddy current forces in quench

- mechanical stress may damage cryostat, heat up mixing chamber $\rightarrow$ loss of ^{3}He and/or target material

4. Cold leaks in cryostat

5. Helium inventory

6. Mechanical compatibility

- cryostat and magnet: radiation shields, target center, support for μ-wave cavity
- mounting magnet on platform