Summary of Monday Morning Session (1)

Invited Talk by L. Rossi "Superconducting Magnets for Particle Accelerators and Detectors

Comparison of requirements and challenges Accelerators vs. Detectors

- **High field vs. low . medium field**
- **High field quality vs. no field quality**
- **Advanced strands (R&D needs) vs. state of the art strands**
- **Stability: wide spectrum of perturbation vs. highly stable coil**
- **MQE of mJ vs. 0.1 – 1 J**
- **Quench protection: Fast heaters vs. external dumper + heaters**
- **Thousands of magnets vs. One huge magnet**

Necessity of modelling impregnated coils

General: We need an integrated modelling for mechanical, e.m. and thermal performance

Cost issues for conductors:

Controlling the stabilizer content
Controlling the magnetization behaviour
Controlling the contact resistance

Going to higher fields: cosθ magnet, block type magnet, use of Nb_3Sn and HTS

Next step planned for LHC: Replacement of IR magnets by Nb_3Sn magnet

Summary of Monday Morning Session (2)

Two Talks considering the Performance of the 45-T-Hybrid magnet at NHMFL

J. Miller describing the experimental results

- **Low n-value of 15 for the cable at 50 μV/m**
- **decreased to n = 5 after degradation which was due to an undetected quench.**
- **Estimation of hotspot temperature of about 500 K**
- **Only 8 kA operation possible (11.4 T instead of 12.5 T)**

Low n-value leads to heating and thermal run away at 12.5 T operation
Runaway could be prevented if the resistive insert was on (reduction of field at Nb_3Sn coil)

More detailed thermal analysis needed

C. Luongo describing the model and results

Development of a thermal model to understand the coil behaviour during and after ramping
AC losses and n-index losses

Issues for model: look on

- **Efect of index heating and influence of n-value**
- **Effect of layer to layer heat transfer**
- **Influence of resistive insert**
- **Thermal recovery of outsert coil**

Model results:

Run away due to index heating
Taking into account layer to layer heat transfer (adiabatic vs. non-adiabatic) leads only to a delay of the runaway
No thermal run away with resistive insert due to reduced field
Recovery time is in the order of 1 hour (due to the end cooling)

Summary of Monday Morning Session (3)

Presentation of GSI Project

M. Wilson describing the project

- **Two rings SIS-100 and SIUS-200, the latter one has a further option (SIS-300)**
- **Main challenge is the pulsed operation (a few T/s)**

- **Nuclotron magnets, RHIC magnets and UNK magnets as options**

- **Modification of Nuclotron magnet design due to the high AC losses but present design leads to training**

L. Bottura describing an alternative conductor design

Alternative conductor design of the Nuclotron conductor:

- **No indirect cooling, high stability margin**
- **No training at all**
- **Pressure drop acceptable**
- **THQB occurs but helps for quench protection. Problem of high pressure rise during quench.**

Further optimisation needed and model has to be built