Agenda and Minutes of the 2nd Meeting of the JRA, Barcelona, 11th May 2010

An open meeting of Work Package 20, the EU FP7 JRA for the muon community, was held at the Casa de Convalescencia in Barcelona on May 11th, 2010, as part of the 2nd NMI3 General Assembly. The meeting reported on the progress of the various Tasks included in the JRA.

Agenda:

1. Overview of the JRA – Tasks and Deliverables (Stephen Cottrell)
2. The high-time resolution detector for the 10 Tesla μSR instrument (Jose Rodriguez)
3. Designing a high Longitudinal Field instrument for ISIS (Philip King)
4. RF μSR experiments using NMR style pulse sequences (Nigel Clayden)
5. Geant4 simulation of the high field muSR instrument (Jose Rodriguez for Kamil Sedlak)
6. Measuring the muon beam in a magnetic field (James Lord)

Talks:

Stephen Cottrell (STFC): **Overview of the JRA – Tasks and Deliverables**
An overview of the JRA was presented, with the progress and timeline for each Task within the JRA highlighted.

Jose Rodriguez (PSI): **The high-time resolution detector for the 10 Tesla μSR instrument**
A summary of the PSI high field project was presented, and the need for a novel detector technology identified. Excellent results have been obtained from a G-APD based prototype detector, the system providing a field independent timing resolution better than ~90ps.

Discussion:

a. Comment: With the dilution fridge designed for a base temperature of ~15mK, problems may be encountered determining an accurate sample temperature below ~100mK.
b. Has the issue of double counting of positrons been investigated?
   Yes, this will be addressed in the talk discussing the simulation of the high field instrument.

Philip King (ISIS): **Designing a high Longitudinal Field instrument for ISIS**
An overview of the HiFi project was given and commissioning data presented. The instrument is now running as part of the ISIS user programme, and recent results demonstrating ALC resonances and a new field induced magnetic transitions were shown.

Discussion:

a. Over what volume is the homogeneity of the magnet defined?
   The magnet achieves better than 40ppm homogeneity over the volume of a typical sample. This was demonstrated by the supplier using a purpose built jig.
b. Do you have additional field probes in the system to determine the field?
   Two probes are mounted in the bore, and readings can be combined to compensate for any field gradients and determine the central field to good accuracy.
c. How does beam steering in the field affect the performance of the system?
   This will covered in the talk given by James Lord.

Nigel Clayden (East Anglia): **RF μSR experiments using NMR style pulse sequences**
Demonstration experiments were presented that show the potential for using NMR style pulse sequences in RF μSR experiments. Currently, setting up this type of experiment is time comsuming, and an NMR system is being developed to enable coils to be characterised prior to the start of the experiment.

Discussion:

a. How does the homogeneity of the main field affect the experiment?
   The absolute homogeneity of the magnet is not crucial for this type of experiment, although the field homogeneity of the ISIS neutron cryomagnets is typically too poor to enable an NMR signal to be measured.

Jose Rodriguez for Kamil Sedlak (PSI): **Geant4 simulation of the high field μSR instrument**
An overview of Geant4 and musrSim and was given, and the potential for using simulation as a tool for developing μSR instrumentation and beamline components explored. The need for a general program to read and analyse the output of musrSim is recognised.

Discussion:

a. Is the musrSim program well documented? This is an aspect of the package still being developed.
b. Is the program available for download from the web? We ask that people contact us by email if they would like to use the program.

James Lord (ISIS): **Measuring the muon beam in a magnetic field**

A CCD camera has been developed and the field dependence of the spot has been profiled. Results show a 'galaxy-like' spiralling of the muon spot and, more significantly, a migration in the position. An algorithm has been developed to adjust the beam steering magnets to compensate for this displacement.