Summary of the Dubna Meeting (30-31 May 2006)

1 Presentations

Bino and Alexey reported on the status of the work in ESA at SLAC.

Nikolay introduced his magnetic simulation work using the TOSCA program. He is comparing simulation results from this program and the MAFIA program. Initial results show that TOSCA is not so optimistic about magnetic field uniformity as MAFIA. Nikolay showed us around a test stand as well which can be used for preforming fieldmaps. It uses a high accuracy linear encoder ($\sim \mu$m) and consists of a massive table of about 5 m in length. Hardware and readout software are close to being finished. He reported as well on a test measurement for a technique using a vibrating wire to measure $0 \int B \cdot dl$ with an accuracy of 0.1 G $\cdot$ cm. Some more mechanical and hard/software details were given by Viktor Romanov and Oleg Brovsko.

Some other measurement thechniques were reported on, such as a technique base upon synchrotron radiation, one based upon compton scattering including a report from a test stand at Novosibirsk and one proposed method by people from Yerevan based upon resonant absorption of photons.

All of the presentations will be found on the website. The preliminary dates for the next meeting have been set to end of oktober, beginning of november in Yerevan, Armenia.

2 Summary of the phone conference with SLAC

The following main items were discussed during the phone conference :

- Mike Woods provided a timescale for the magnet work at SLAC. The old H-type magnets which are available at SLAC will undergo refurbishment. Where the pole faces need to be machined, the water cooling and the electric connections need to be hooked up and checked together with the coils themselves. This will be done mid to late september. The mapping of the field can start after that, so in oktober and will be done by Michele Viti (DESY-Zeuthen), Sergei Kostromin and Viktor Romanov (Dubna), assisted by people from the workshop at SLAC. The installation of the magnets in the end station will occur in december, so a first testrun with beam can be performed in january of next year.

- The magnets are approximately 45 inches long with a 10 inch wide pole face. The idea is to run them at 1 kG and a disperson of 5 mm. We want to have the integrated field stabalized using a feedback system at the 10^{-3} level and monitor the field using NMR probes at the 10^{-4} level.

- The technical drawings of these magnets, provided by Ray Arnolds, were passed on to Nikolay Morozov, who will implement an initial simulation using TOSCA in order to find out an optimal placement for the probes. After the refurbishment this simulation will have to be refined.

- As to equipment we will need to acquire

  - **NMR probes** for the dipole field.
  - **Flux Coils** for monitoring of the stray field.

  Dubna has equipment available for long term stability measurements, temperature/current stabilisation etc. People at SLAC will look into what is needed and come up with a list.

- An issue brought up by Heinz-Juergen Schreiber about whether or not it makes sense to measure the field inside the beampipe. As the idea for the end station tests is to investigate relative stability of the energy measurement and only to a lesser extend have an absolute measurement, this is probably not important. TOSCA simulations from Nikolay Morozov can estimate eventuall effects.

- Sergei Kostromin and Viktor Duginov will come to SLAC join for the July testrun. We need to make sure that the invitations from SLAC for Sergei Kostromin and Viktor Romanov reach Dubna two months before the test measurements in oktober are planned.

- The question arose whether it is possible to measure 0 integrated field. Dubna experts will bring a flux-gate magnetometer to SLAC and investigate this option during the mapping of the field. A vibrating wire technique can also be used for this but this setup is only available next year. It can however be moved to SLAC.

- For a next phone conference, an alterative conferencing system would be preferred.

3 Discussion with Nikolay Morozov and Sergei Kostromin

- The price to manufacture an eventual magnet for the spectrometer at Dubna would be on the order of k$30 for a 1.5 m long magnet without instrumentation. Roughly the price scales as $10/kg of iron, Nikolay informed us. The total design and manufacturing takes on the order of a year, with roughly 3 months design phase and acquirement of the raw materials and 9 months of manufacturing.

- Nikolay provides us with a huge archive of internal notes in electronic form about magnet design and magnetic measurements in general.

- Nikolay proposes a combination of NMR probes for measuring the total dipole field as they can only operate in limited gradient fields and have a relative accuracy of 10^{-5}, and Hall probes to measure the edge fields with an accuracy of 10^{-4}. He proposed to complement this measurements with a system based on induction coils. A detailed description of this method is found in the internal notes he provided us with.

- Sergei Kostromin's work basically involves simulation and tracking of particle bunches through the chicane. He is adapting a Mathematica-based code which is used for cyclotron calculations. So he is now working on changing the coordinate system to carthesian coordinates. This code does an integration of the full equations of motion, without any approximations or simplifications. His code is also able to use a real field map as measured or as simulated from TOSCA by Nikolay. It will be good to compare and cross check results with work done in the UK.