

Micro Magnet Review Dec. 17, 2003

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The electronic versions of the presentations are collected in the Beams Document Data Base under the Title "Micro Magnet Review 12-17-2003" and the authors list will include P. Bauer, M. Martens, P.Schlabach, V. Shiltsev, and A. Tollestrup.

The following are the Findings and Recommendations of the committee:

1. There are very reliable magnet data from MTF, especially with regard to the time dependence of hysteresis effects in the TeV dipoles. The TeV group should incorporate this new information into the operation of the Tevatron in a timely manner. A two stage approach may be useful to consider as some changes can be made rather easily while others will require approved Tevatron study time. Mike Martens gave a very nice road map for making the necessary changes.
 - a. Fix the magnet cycle as soon as possible. Eliminate multiple ramps and fix the length of the back porch. It is very important to note that this will also help with further MTF studies as it will reduce the number of variables they have to study.
 - b. Fix the algorithm for snap-back as soon as there is a general concensus on how to do it.
 - c. It is now known that there are long term drifts in a1,b1 and a series of experiments should be planned to measure how this averages out in the TeV.
2. Data are available but not yet analysed for the decapole and allowed higher harmonics. They should have similar time dependance and snap-back behavior as the sextupole.
 - a. MTF should finish the analysis of these data.
 - b. The effects of drifts in these multipoles should be simulated to see if they are important before additional extensive measurements are scheduled in MTF.
3. Measurements on quadrupoles should start as soon as the MTF schedule permits. It is important to understand any time dependence of the quadrupole fields. Knowing the Tevatron's expected tune variation with time is the major goal. Without such measurements it will probably be very difficult to understand Tevatron performance.
4. It is apparent that the construction of a long term test stand to mimic TeV magnet cycle history will exceed the effort available in MTF if the higher priority measurements mentioned above are to be carried out. Consequently we recommend that this program not be carried out at this time.

5. There was a very interesting discussion about measuring the noise spectrum in the magnets up to 35 khz. We recommend that MTF not undertake this project now due to the lack of resources. However, the data Vladimir showed look very interesting. Before planning such a measurement for the Tevatron, a good study should be undertaken in MTF in to identify the physical processes that cause the effects shown in the data. This would be a great project for a PhD thesis! We should try and find a student.

6. We suggest a more careful look at temperature effects in the Tevatron. Since the persistent currents are sensitive to temperature, it would be good to document what effect magnet temperature could have on the observed drifts of the multipoles. A simple experiment/observation may be possible under abnormal operating conditions when cryogenic conditions change due to equipment failure.