

## **Meeting of the TPC Evaluation and Study Group August 28, 2002**

Present:

H. Caines, J. Dunlop, A. Lebedev, T. Ljubicic, T. Ludlam, R. Majka, C. Pruneau, N. Smirnov, J. Thomas, H. Wieman

This was the inaugural meeting of a group whose purpose is to examine the performance, environment, and long-term capability of the STAR TPC in light of the plans discussed at Bar Harbor to embark on a major upgrade of the readout electronics to allow high rate operation at enhanced RHIC luminosities (4 x design, or about 10 x the peak values seen in the last Au-Au run). We ran through the full gamut of issues, and discussed work that needs to be done. Listed here are the topics discussed, and the assignments of tasks:

### Gating Grid Operation at high rate:

Tonko and Alexei will work with Blair Stringfellow to set up tests to see if there are system problems with operation at ~1 KHz. Howard will pursue a calculation of grid transparency at this rate, with estimates of ion feedback.

There may be concerns about wire ageing due to increased rate of charge on the anodes. The best way to monitor this is to see if gain settings change as a function of radius over a period of time in the calibration.

### Space Charge effects:

Nikolai's simulation studies indicate that local fluctuations in space-charge effects are at the level of 20% at design luminosity. If confirmed, this may be a problem. Less so if the effect scales as the square root of the number of ionizing particles.

Dick Majka pointed out that the origin of space charge (collision-related vs. beam backgrounds) can be studied by looking at variations during a Van der Meer scan. This led to a discussion of the use of laser tracks to study distortions. It was pointed out that Fabrice Retiere has some results posted on the web indicating that laser track reconstructions are not reliably reproducible. Tonko and Alexei will look into this. Howard pointed out that there may be a leakage of ions between the inner and outer sectors, i.e. between pad rows 13 and 14.

### Monitoring the interaction and background rates:

Jamie will get together with Hank Crawford to develop a plan for using the scalar boards to provide a replacement for the RHIC scalars from previous runs, utilizing signals from ZDC, CTB and BBC counters. Dick Majka will coordinate with C-A Dept. on beam background studies. We may be able to use existing data to correlate background effects with collimator positions and with beam vacuum monitors around the ring.

### Overall calibration of the TPC:

Jim Thomas provided a white paper summarizing the sources of distortion for reconstructed tracks in the TPC, and the magnitudes of the resulting corrections. The

overall calibration is a complex process which is not yet fully under control. This is evidenced by the mis-match between RHIC and TPC tracks, and the need to average positive and negative tracks at high  $p_t$ . The effort to match SVT and TPC tracks is just beginning. Jim, Claude and Jamie will work with Dave Hardke to help ensure a coordinated effort among the analysis groups.

Next Meeting:

We agreed to meet in ~1 month to update progress. The tentative date is Wed, October 2.