

Memorandum

Subject: test beam 2004

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We can run for 2-3 days in the H2 zone with the 25-ns-bunched-beam during the week 28/9 – 4/10. The beam time, with normal beam, starts on 22/9. The zone and the beam time has to be shared with the CMS HCAL group.

We propose tests which need either one chamber or two chambers. The initially foreseen test with two chambers and the DTF cannot be performed because the hardware will not be ready in time. We anticipate that in any case at least one chamber should be MB1 or MB2 type (with its respective Minicrates) to test the “shift bit” in the TRB configuration.

Test with a single chamber:

1) Test of the synchronization procedure in autotrigger mode. The synchronization in the 2003 test beam was done measuring the efficiency of HH triggers as a function of the delay triggering with the scintillators. At CMS we will not have any scintillator and a different procedure based only on the autotrigger must be developed and certified. Runs must be done at different angles, and at different vertical positions (if possible). Estimated time: 8 hours.

2) Test of TRB configurations that were not or were badly tested in the 2003 test beam:

- Correct selection of non-redundant patterns;
- Correct test of BTI acceptance window;
- Test of the TRACO “shift bit” (both left and right);
- Few tests with combined options;

Estimated time: 8 hours.

3) Test with iron bricks in front of the chamber at different muon energies and in backup mode. Estimated time: 8 hours.

4) Test of dimuon trigger with higher statistics and a dedicated beam trigger with scintillators. Estimated time: 8 hours.

5) Test of trigger noise with gamma background up to 30 Hz/cm² (if possible) with a radioactive source. Estimated time: 4 hours.

Test with two chambers:

6) run with autotrigger.

• In the 2003 test beam, the autotrigger runs were wrong, as discussed by A.Meneguzzo [1]. Some tests have been performed with cosmic rays at LNL, showing a correct operation of the autotrigger [1]. Anyhow, a serious test with the 25-ns-beam is mandatory. The second chamber is needed for off-line selection and efficiency cross-check. The beam scintillators are however readout.

- Coincidence test of the two chambers (for preparation of the cosmic-ray data taking at SX and ISR);

7) Test with iron bricks in front of and in between the chambers.

Test with 1 chamber coupled to RPC, if the RPC group is interested, in alternative with the test with 2 chambers, for:

8) run with autotrigger, as at (6);

9) verification of the electronic noise with the final electronics and HV layout;

10) cross-check of the detector efficiencies.

Since there will be no beam available at CERN next year (and possibly also in 2006) this is the last possibility for test (1) and (6) (or (8)) before complete chamber installation.

There might be an interference between the test beam and the test of Minicrates, at least during the data taking, for the hardware and for the presence of experts needed. This can cause the stop of the Minicrate test for 2-3 weeks in September-October, if the current effort for duplication of the hardware will not succeed. Moreover, if we run with two chambers, or with the RPC, some additional software and DAQ tests are required, starting in June. In this case, since we believe that the last date for a successful test beam is June 1st, we request as soon as possible a decision about the test beam.

[1] A.Meneguzzo, available on http://www.pd.infn.it/~ameneg/TB2003/AUTO/TB2003_autotrigger.pdf