

Commissioning plan for beam trip studies with Struck scaler

March 21, 2015

The goal of these studies is to try to investigate whether beam moves (especially in a vertical direction), when the beam trips, or beam recovers from a trip. In case if there is a movement then, is it small enough to not touch SVT layers?

The plan is to put Harp thick wire (parallel to horizontal plane) close enough to the beam (from top and bottom), that channels (ECal and HPS-R halo counter) that are connected to Struck scaler will have sufficient counts in every $15 \mu s$ time interval. This will correspond to about $1 MHz$, and can be monitored through forward scaler epics GUI. Since the closest Harp to the SVT is harp 2H02A, we should use that harp for these studies.

0.1 Determine harp positions

To Determine positions where to put harp wires, one should do a harp scan when motor position limits are from 9.5 to 13.2 ("Start scan at" and "End scan at" respectively in the 2H02A harp scan GUI). This will scan harp "Y" wire. Then we should look into the harp data file which is located at `"/home/epics/DATA/HARP_SCANS/harp.2H02A/"` (the last modified file), and from that file looking into relationship between motor positions and halo counter counts, we should determine appropriate motor positions of harp, when the wire is on the top and on the bottom of the beam. We should use low currents ($10 nA$) for the harp to not damage calorimeter crystals and sturate halo counters.

0.2 Taking data

Now when the wire is in a desired position, let say first, at the bottom of the beam. Then before starting data taking call MCC to shut off the beam, tell also that as soon the beam trips, don't deliver a beam until you will ask for it.

When Waveform writer is open, and you are ready to take a data, make sure that MCC is ready to deliver a beam, then push a "Write" button and ask for a $100 nA$ beam. **NOTE: It is important that you push a "Write" button before they give a beam. This will allow to study, whether there is a beam motion during the beam start.**

Now when Waveform writer is recording data, please watch the downstream viewer screen, (where you should see the beam spot) to catch the beam trip. Please watch also forward scaler and make sure rates are of the order of $1 - 3 MHz$. As soon you catch a beam trip, stop the run and ask MCC what was the cause of the trip. You can find output file in the `"/usr/cls12/hps/DATA/waveforms"` directory. Please for each run document the following information, run N° , filename, size, time of the trip, and trip type. An example can be the Table 1.

Run N°	Filename	File size and time of the trip	trip type
1	w2r_20150315_183825.root	208M Mar 15 19:20	BLM
2	w2r_20150315_192452.root	8.5M Mar 15 19:27	RF trip
3	w2r_20150315_193146.root	47M Mar 15 19:41	RF trip

Table 1: An example of documenting beam trip run information

As soon you documented these information you can proceed to the next run. Will be good to have 10-15 runs for each wire positions (btotom of the beam and on the top of the beam).