

Fall 2015 Run Plan for the Tagger Microscope

Goals

With the chance of having beam this fall, the following are the goals of the tagger microscope:

- Continue bias voltage studies
- Collect data with optimal bias voltages to use for calibrations
- Threshold scans to determine optimal threshold value for a given bias voltage setting

Bias voltage studies

These studies will be used to determine the optimal bias voltage setting for each channel in order to maximize signal quality. For a given bias voltage setting there will need to be 5 data runs, one for each row of the microscope. Each of these runs will only have one row biased at a time so that the summed channel will be the same as an individual readout. Previously runs of 200k events using the PS trigger were collected. This is sufficient for determining the performance of a certain bias voltage level.

The studies completed so far have been 15 adc (+0.25 V), 20 adc (+0.65 V), and 25 adc (+1.0 V). The studies are referred to in terms of their single pixel height in adc units and also the increase in voltage above the values provided by Hamamatsu. Additional studies may include 30 adc (+1.5 V) and 35 adc (+2 V).

Threshold scans

With the increase in signal from the increased bias voltages the thresholds will need to be adjusted. It would be useful to perform threshold scans to determine the optimal value for the threshold.

Calibration data

Once the bias voltages have been optimized it would be beneficial to collect data with these settings for calibrations. The spring 2015 running provided a few runs useful for calibrating, 3179-3186, but these were mixed trigger runs. Running with the optimal voltages for a half shift to a shift will provide more statistics than the spring 2015 run.

Beam time estimates

Bias studies

The previous bias studies had a trigger rate of approximately 1 kHz. Assuming the same trigger rate it will take roughly 20 minutes to collect data for all rows at a given bias voltage for 200k events each.

Calibration data

Assuming a PS trigger rate of 1 kHz, a 4-hour data set would provide 14 million PS triggered events. The 25 adc bias study runs from the spring 2015 contained a total of 1 million PS triggers with 98k in time events. The spring 2015 runs used for calibrations were 3179, 3180, 3182, and 3185-86 for a total of 92 million events triggered between the FCAL, BCAL, and PS, with 700k events in time with the PS.

Running for 4 hours should provide roughly 1.3 million in time events, based on the spring 2015 25 adc bias study runs.

Threshold scans

These scans should not take more than a few minutes to run.