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Draft response from the Silicon tracking sub-group

In particular, we’d like to ask you if an early, preliminary estimate of the following key parameters is already available for the detectors that you are currently focusing on:

* The kind of detector, for instance gaseous detectors, solid ones (silicon or alike), scintillating ones (fibers, scintillator slabs,..), calorimeters (which kind ?), etc…

We anticipate using Monolithic Active Pixel Sensors (MAPS) for the vertex detector, barrel layers and discs that make up the inner detector area. These are silicon sensors with the signal processing built into the same silicon die as the detector silicon.

* If a front-end electronics is already included in the detector structure, or if a kind of front-end electronics is already considered to be associated with that detector

The front end electronics signal processing and zero suppression is already built into the MAPS signal processing on die. The data returned is addresses of hit pixels with a typical cluster size of ~3 pixels per charged particle track. Each sensor contains a threshold that is adjusted to give >99% efficiency and ~10-9 fake hit rate. The hit pixel data is binary.

* The total number of channels foreseen for the detector

The total number of channels will depend on the configuration chosen. However, since zero suppression is already built in, the data load is already reduced to the number charged particle track hit clusters plus whatever backgrounds and noise that can be expected in the environment. The typical electronic noise associated with the detector technology is typically less than 10-9 in the technologies under consideration after the masking of noisy pixels which make up a very small fraction of the sensor pixel total. For a detector with the standard characteristics of the BEAST example we expect that the pixel count to be of order 15G. As with the previous MAPS based detectors, the channel count is very high that the noise rate must be carefully managed such that it does not saturate the readout bandwidth and data load.

* The average rate per channel and the maximum rate per channel at the nominal EIC conditions
* The data that has to be acquired per each channel (hit time, hit amplitude, hit digitized waveform, …)

The data acquired for each channel will include (from every sensor with a hit) will be hit addresses and timing information with of order 10ns resolution. The number of bits required for the timing information is still undefined.

* The background level foreseen for that detector (physics background, low energy particle radiation, electronics noise,..)

These numbers (except for the electronic noise which is described above) are still in flux and will be the outputs of the simulation efforts currently planned and underway.