

Lumi Update 2024/04/04

Nathan Heinrich

Making progress on the lumi analysis.

Still waiting on Dave Mack to get back to me on the BCM calibrations.

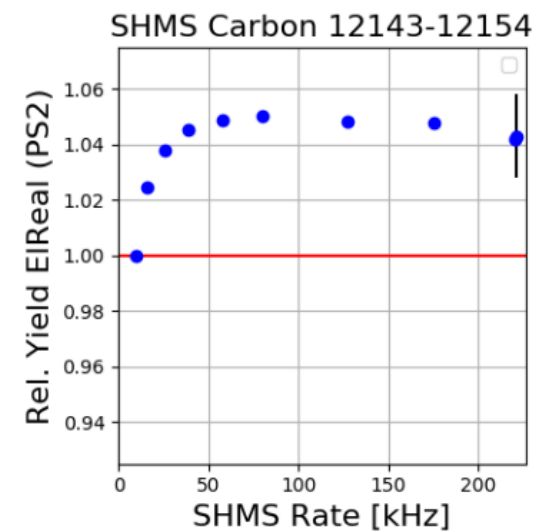
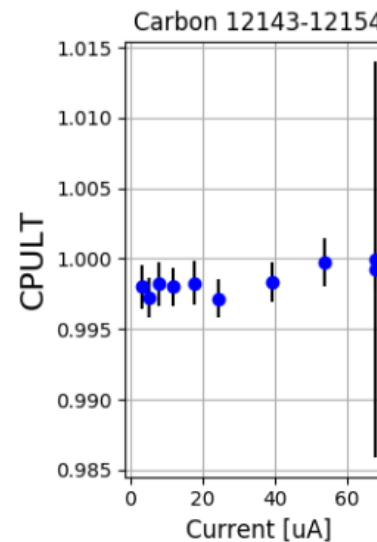
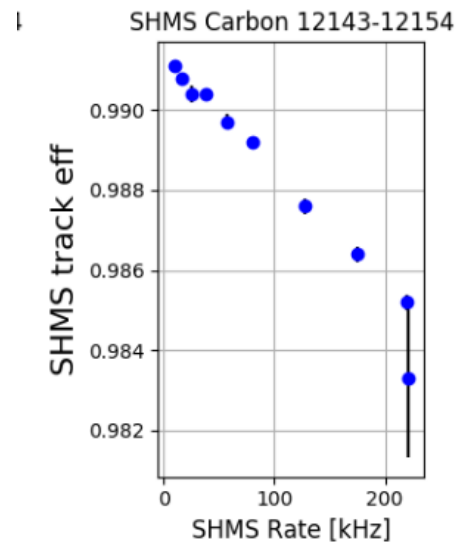
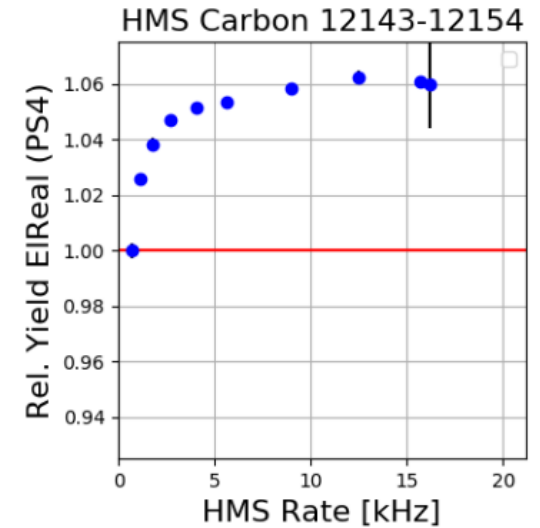
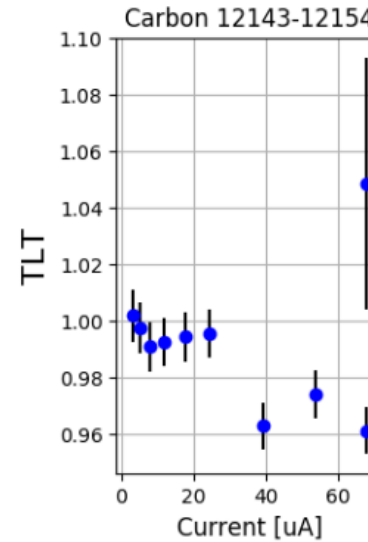
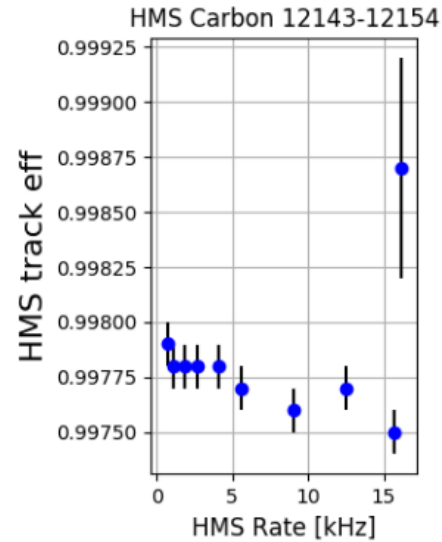
Have calibrations valid for 2 lumi scans from 9.2GeV beam energy

Showing the status of those

9-2 Carbon Scan 1

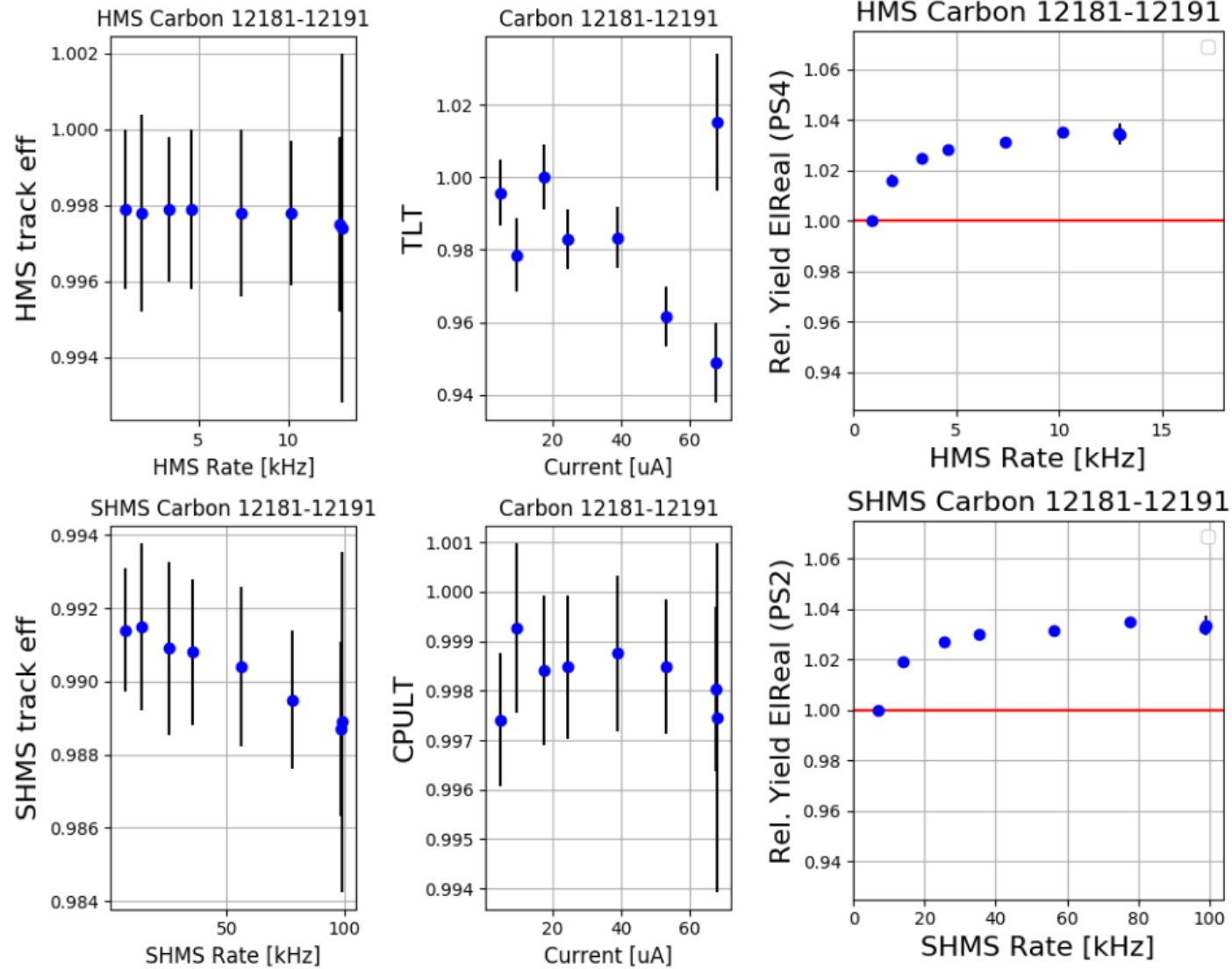
Large anti-boiling in scalar yield, but all the live-times look OK

I would wager that means that at 3uA there is ~5% over estimation of current



9-2 Carbon Scan 2

Same story here.



BCM offsets

- Went looking for what offset (if any) was being applied already found 2:

```
235 # Iterate over all scaler events to get various scaler values
236 for i, evt in enumerate(s_evts):
237     # Correction to bcml from Peter Bosted
238     if (current[ibcm][i] < 60):
239         bcmcorr = 1.00+0.045*(math.log(60)-math.log(abs(current[ibcm][i]))/(math.log(60)-math.log(2)))
240     else:
241         bcmcorr = 1.00+0.010*(current[ibcm][i]-60)/25
242     current[ibcm][i] = current[ibcm][i] * bcmcorr
```

```
325 # Creates a dictionary for the calculated luminosity values
326 scalers = {
327     "run number" : runNum,
328     "time": time_sum[bcm_ix],
329     "charge": charge_sum[bcm_ix],
330     "curr_corr" : (charge_sum[bcm_ix]/time_sum[bcm_ix]+0.05)/(charge_sum[bcm_ix]/time_sum[bcm_ix]), # 50 uA current offset
331     # "CPU T scaler": acctrig_sum/((trig_sum[hms_ps_ix]/HMS_PS) + (trig_sum[hms_ps_ix]/HMS_PS)) # GOOD
```

These are both found here:

https://github.com/JeffersonLab/UTIL_PION/blob/master/scripts/luminosity/src/scaler.py

The first one I don't understand, the second makes sense as a 0.05uA increase in the total current