

Run Coordinator Report

Jerry Gilfoyle (Richmond)
January 13, 2020

Run Summary

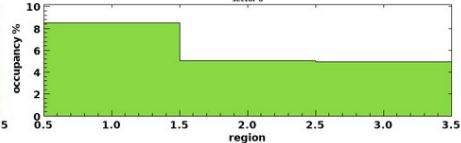
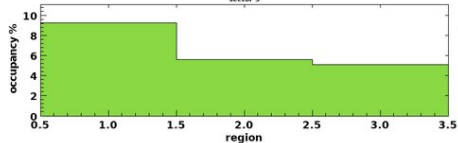
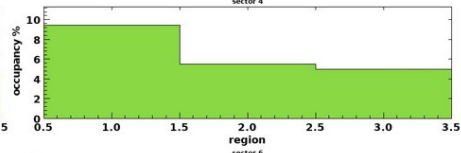
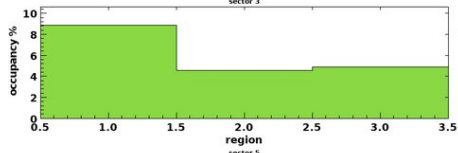
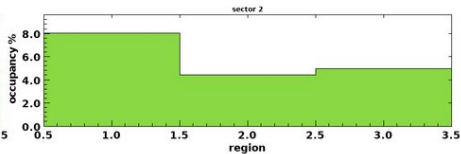
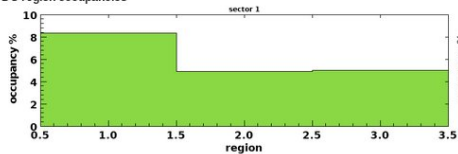
- Jan 2-5
 - MCC restoring beam.
 - Hall B locked out during afternoon of Jan 5.
- Monday, Jan 6
 - Shifts manned starting with Day shift.
 - Beam to tagger dump about 15:35.
 - Establish beam to the hall - perform harp scans
 - Moller runs on swing shift
 - Polarization - half-wave plate IN(87.1 ± 1.5)/OUT(-87.2 ± 1.5)
 - Measure beam offset with FTC scalars.
 - Started first production run - 21:42, 10 nA (low luminosity)
- Tuesday, Jan 7
 - Completed two low luminosity runs - 10 nA, 52M triggers, 6 hrs.
 - Turned beam up to 50 nA, but repeated DC trips made running unsustainable.
 - Reduced beam to 40 nA. DCs stable. Run 11328 had 87M triggers.
 - Spin dance began at 7 am.

- Wednesday, Jan 8

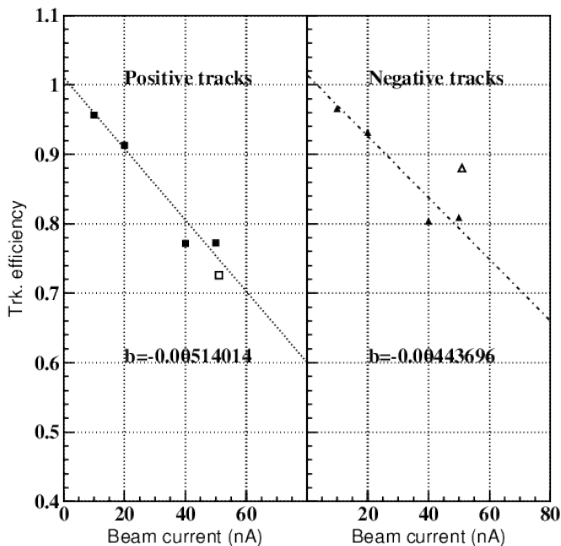
- During spin dance did FTOF/CTOF calibration - 20 nA, 93M triggers, before spin dance actually began so Moller measurements still valid.
- Did random trigger run `rgb_inbending_v9_1_random.trig`, 20 nA, three hours of beam on target.
- Did Moller runs after spin dance was complete.
- Polarization - half-wave plate OUT(-85.0 ± 1.5)/IN(not submitted).
- Mac Mestayer raises threshold on DC HV to reduce trips. DC HVs are stable at 50 nA.
- Run 11338 is at 50 nA and observe high (8.5%) DC occupancies, large fluctuations in livetime, high rates from `mvt1` and `mvt2`. See plot.
- Beam energy on the scalar GUI read 10.2 GeV when it should be 10.4 GeV. There is a communication issue somewhere in the chain from MCC to the CLAS12 beamline GUI. MCC is aware of this and later found problems in on of their databases. They are working pn a solution.

DC occupancy - run 11338, 1/9 swing, 50 nA

DC region occupancies



DC efficiency study

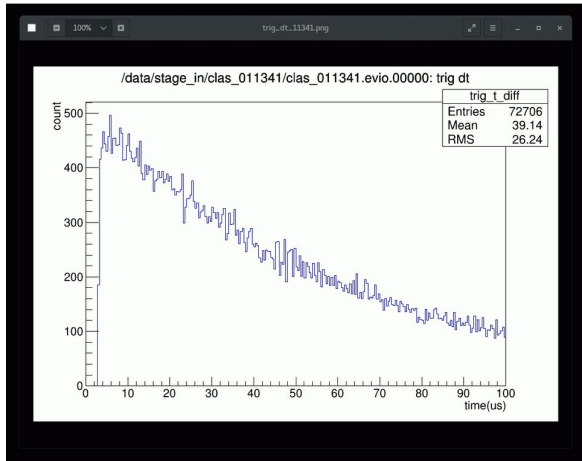


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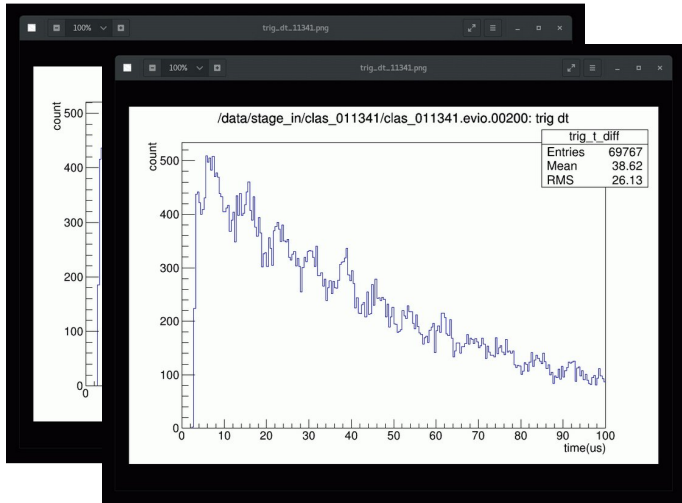
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- Thursday, Jan 9
 - DC occupancies - higher than past RGB runs (spring, Dec 2019).
 - Other FD systems show occupancies within a few percent of past performance.
 - Gas mixture different from past RGB runs, will take a while to correct because of large buffer volumes.
 - Analysis effort ongoing compare tracking efficiency between low- and with high-luminosity runs (10 vs 40, 50 nA) taken this week.
 - New hole in DC occupancy plot - fixed with new DCRB board.
 - Injector laser phase noise - large amplitude oscillations in the trigger-time (time between successive events). See plot.
 - Large variations and low values of livetime.
 - Seen before in HPS. Related to 100 kHz noise in the injector.
 - Injector expert tuned the phase and oscillations disappeared, but returned in 1 hr.
 - Six-hour injector work on Fri appears to have fixed it.

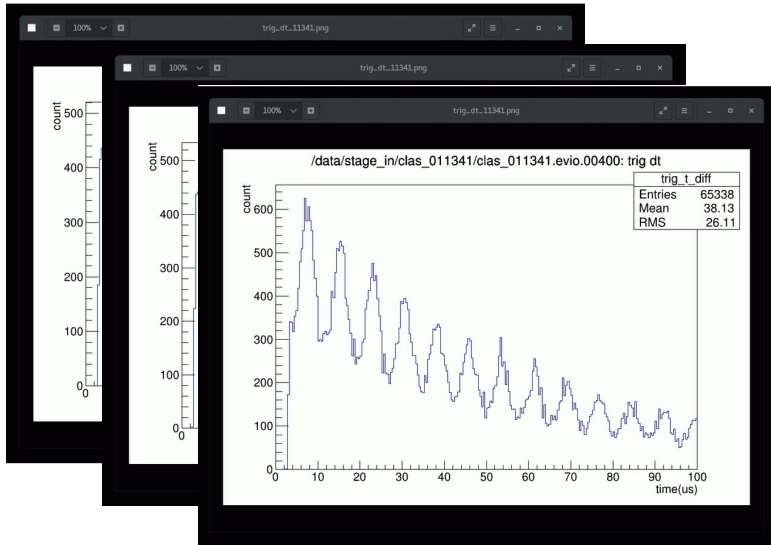
Injector laser phase noise



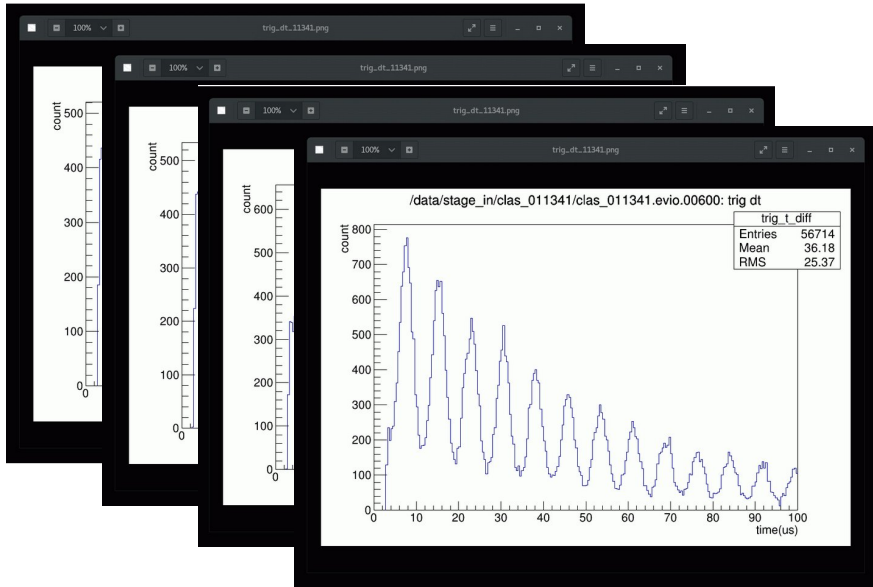
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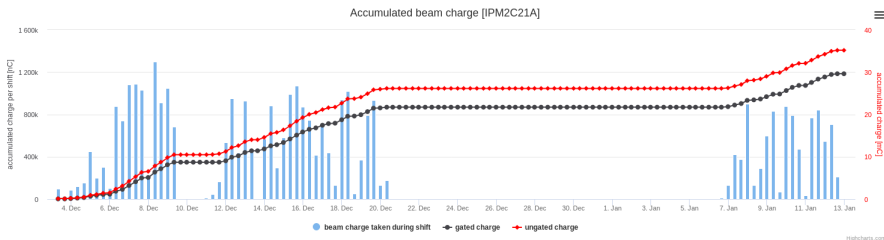
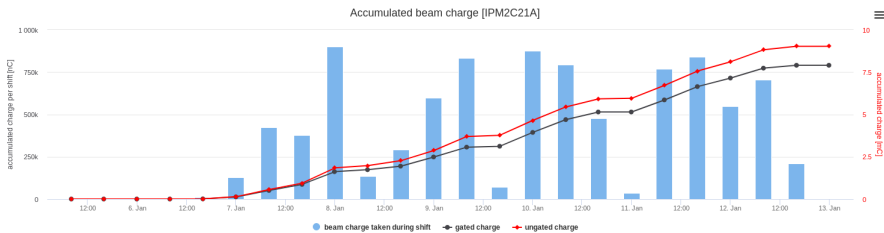
Injector laser phase noise



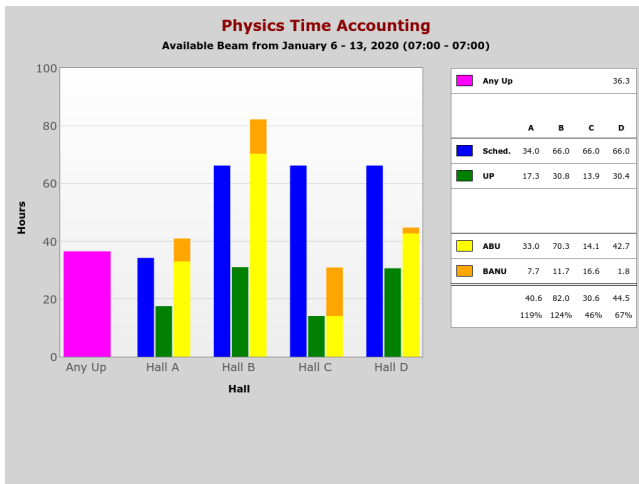
Run Summary

- Friday, Jan 10
 - Production running at 35 nA to mitigate high DC occupancies. Silvia sad.
 - Six-hour halt to beam for injector work.
 - Did harp scans after long shutdown.
 - Did a run with the spring, 2019 trigger file to see if that was causing the high DC occupancies. The trigger file is innocent.
- Saturday, Jan 11
 - Continued production running at 35 nA to keep Region 1 DC occupancies to a minimum.
 - Hall C switches to 1-pass running during swing shift. Change in the Wien angle of 11 degrees.
- Sunday, Jan 12
 - Continued production running at 35 nA.
 - Did Moller runs
 - Polarization - half-wave plate OUT(-86.6 ± 1.5)/IN(84.3 ± 1.5).
 - Magnet overheating problems cause current shutdown.

Accumulated Charge

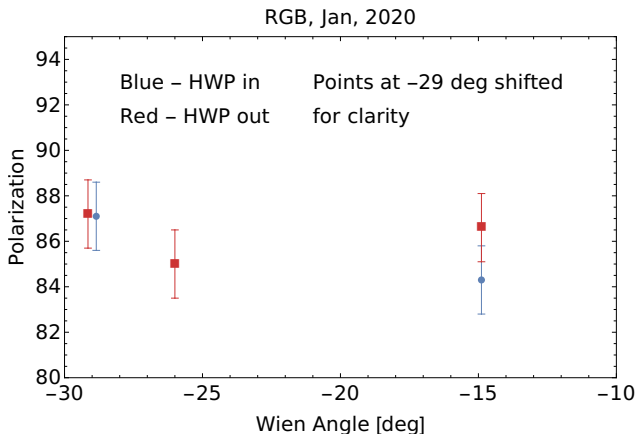


ABU and Accelerator Availabilities



Beam Polarization

- So far we have three Moller measurements, with both half-wave plate positions (IN/OUT). One has to be resurrected from the disk.
- Range of the Wien angle is small compared to past measurements.



- Continue production running at 35 nA. Higher if the DC occupancy mystery is solved.
- Hall C: Will go to 5-pass in two days and will return to previous Wien angle setting (so we won't have to do a Moller).
- At some later time we need to do an empty target run. Current should be 150 nA for 50M triggers which should take 2-3 hours.