

Diamond-II: Fill Pattern

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Diagnostics Group

Requirements

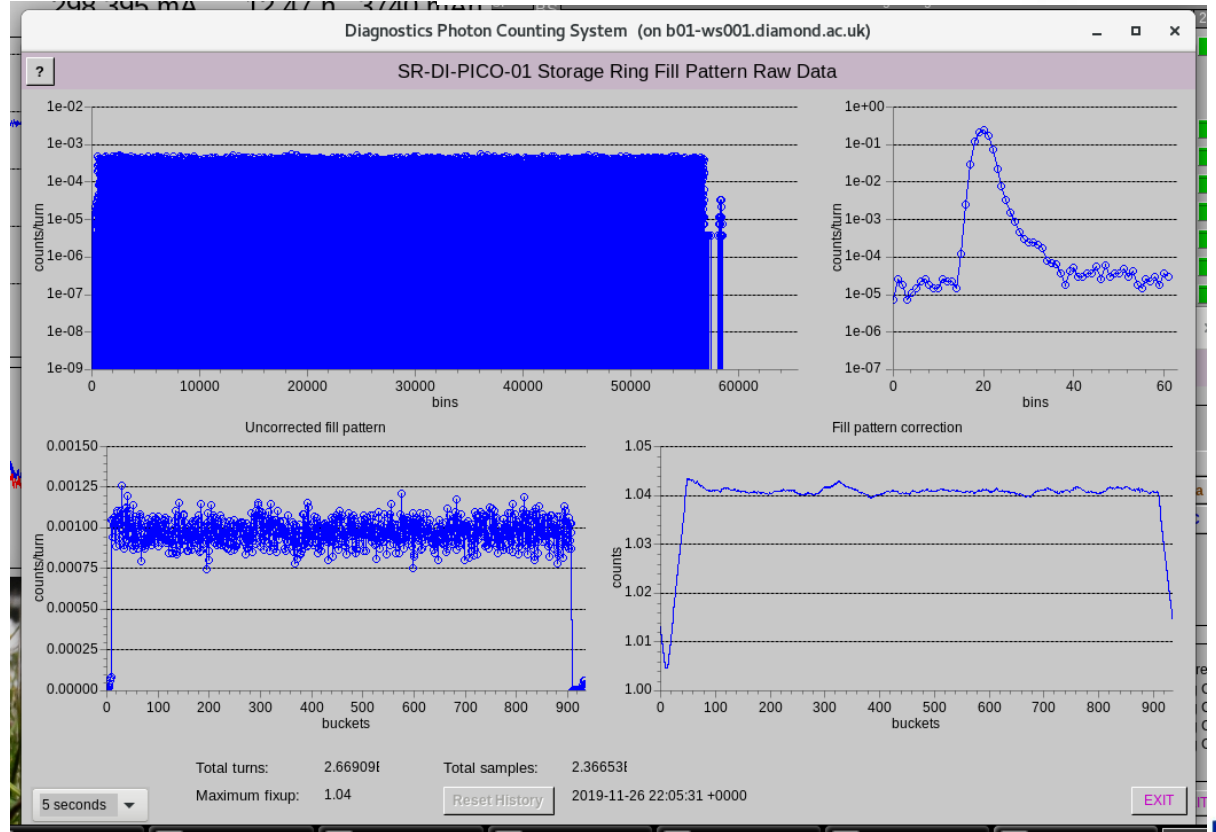
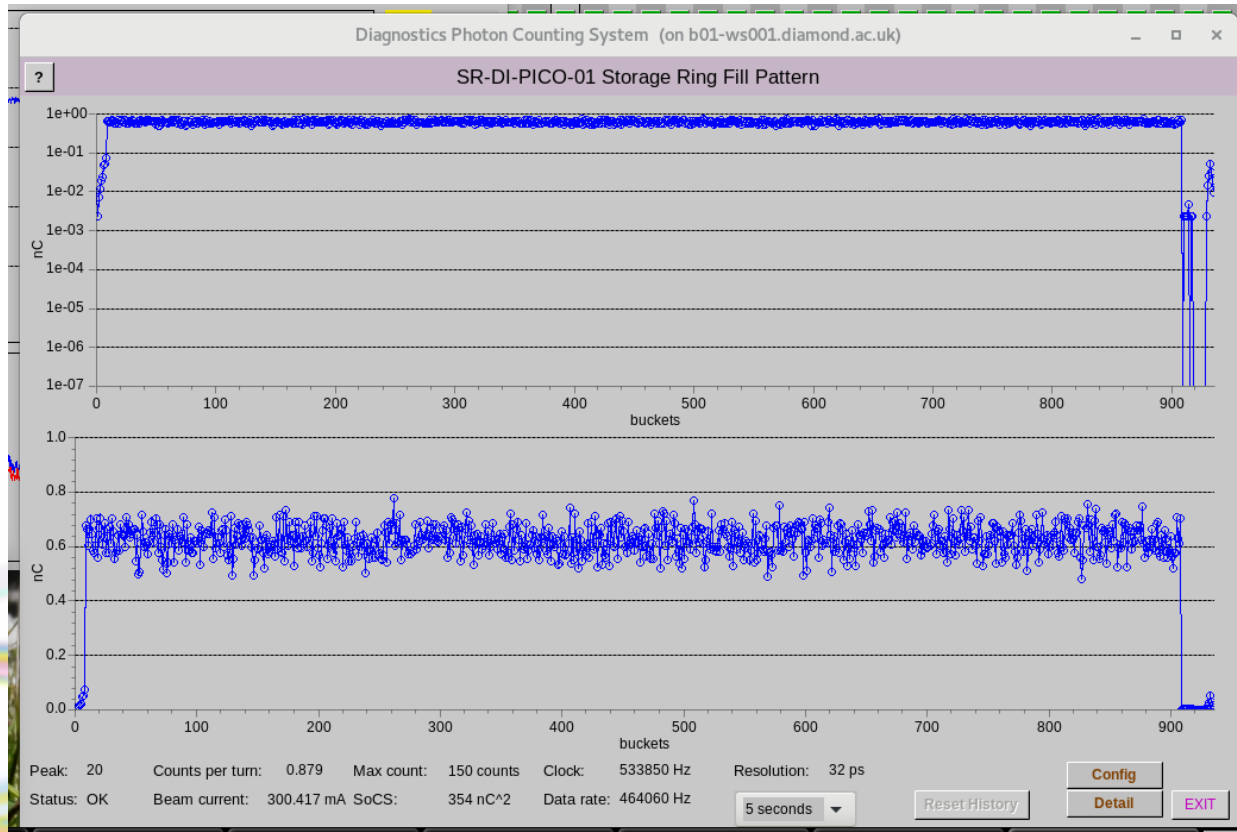
- Reliably measure fill pattern 24/7 for top-up.
- Provide bunch purity measurements.
- No changes in requirements to existing systems deployed on Diamond.
- Two independent systems:
 - Visible SR system in B01 cabin. (Primary)
 - X-ray SR system with detector in-tunnel (Back-up)

Reference although some parts are out of date:

C. Thomas et al., Bunch Purity Measurement for Diamond, Nucl. Instr. and Meth. in Phys. Res. A, 566, 2, (2006)

Fill Pattern Monitor

- Time Correlated Single Photon Counting System (from Picoquant <https://www.picoquant.com/>):
 - Readout: PicoHarp 300
 - Detectors:
 - Visible: Hybrid Photomultiplier detector assembly (Picoquant)
 - X-ray: Avalanche Photodiode (Hamamatsu)



Summary

- No change in required performance, so we can re-use existing system. Perhaps acquire a spare Picoharp 300 since existing systems are old and well used.
- All components are still available from Picoquant and Hamamatsu.
- Can use either system, added robustness for day 1 operation of Diamond-II.