



Muon g-2 update

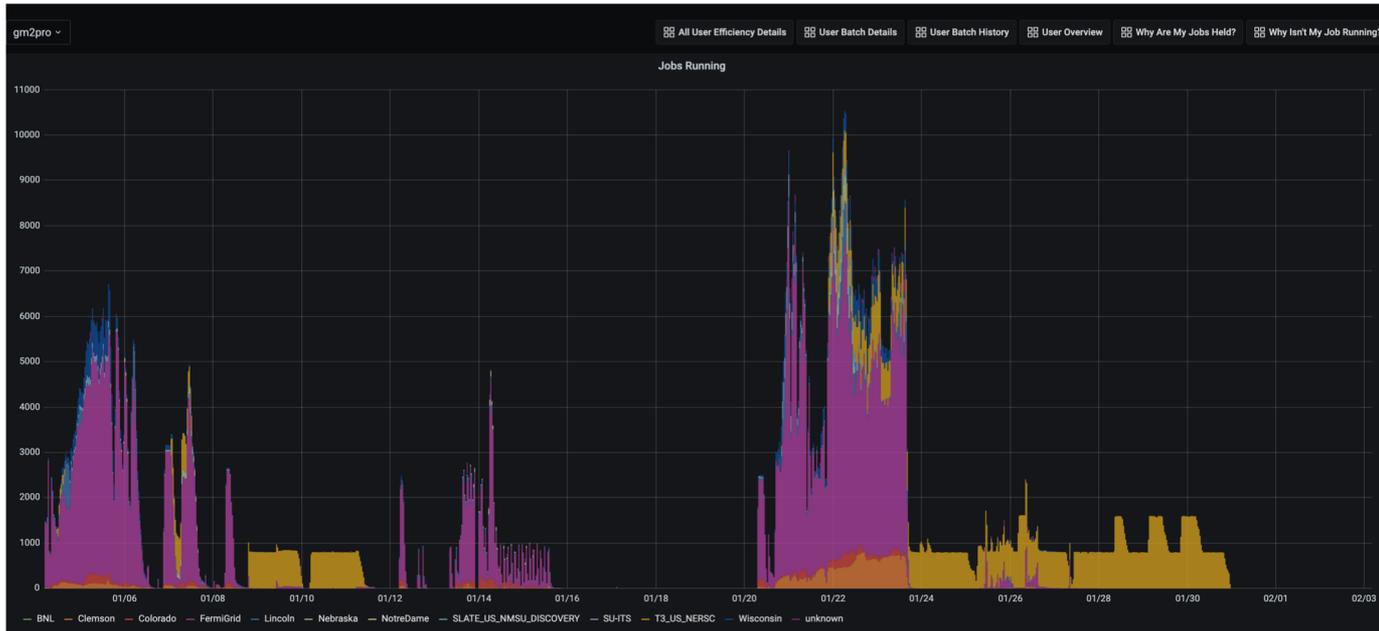
Anna Driutti (UK), Greg Rakness (FNAL) – g-2 Ops Managers

Proton PMG / AEM

04-Feb-2021

[https://indico.fnal.gov/event/47615/
GM2-doc-db-24547-v1](https://indico.fnal.gov/event/47615/GM2-doc-db-24547-v1)

Computing slide



Onsite Efficiency

52.81%

Average Efficiency

59.74%

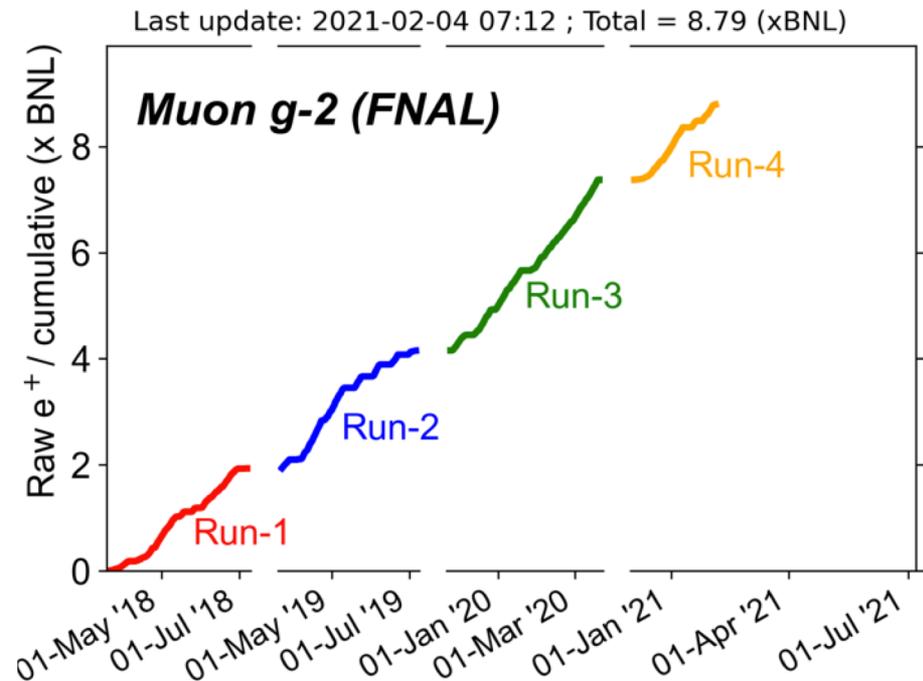
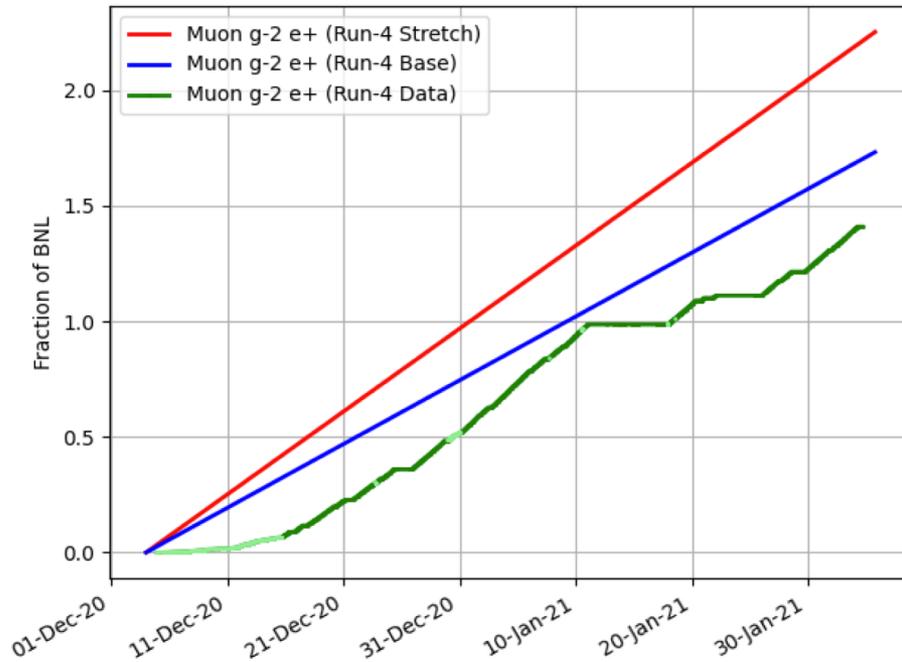
Offsite Efficiency

76.52%

- Production is struggling with copying files from tape to dCache (pre-staging).
 - Slowed production for over a month.
 - SCD has plans to mitigate. Setting up a dedicated g-2 read/write pool (350 TB).
- Recall that we must reprocess data due to calibration mistakes.
 - Working with SCD to resolve errors in offline workflow.
 - Will resume data processing after updating to a more rigorous production procedure.

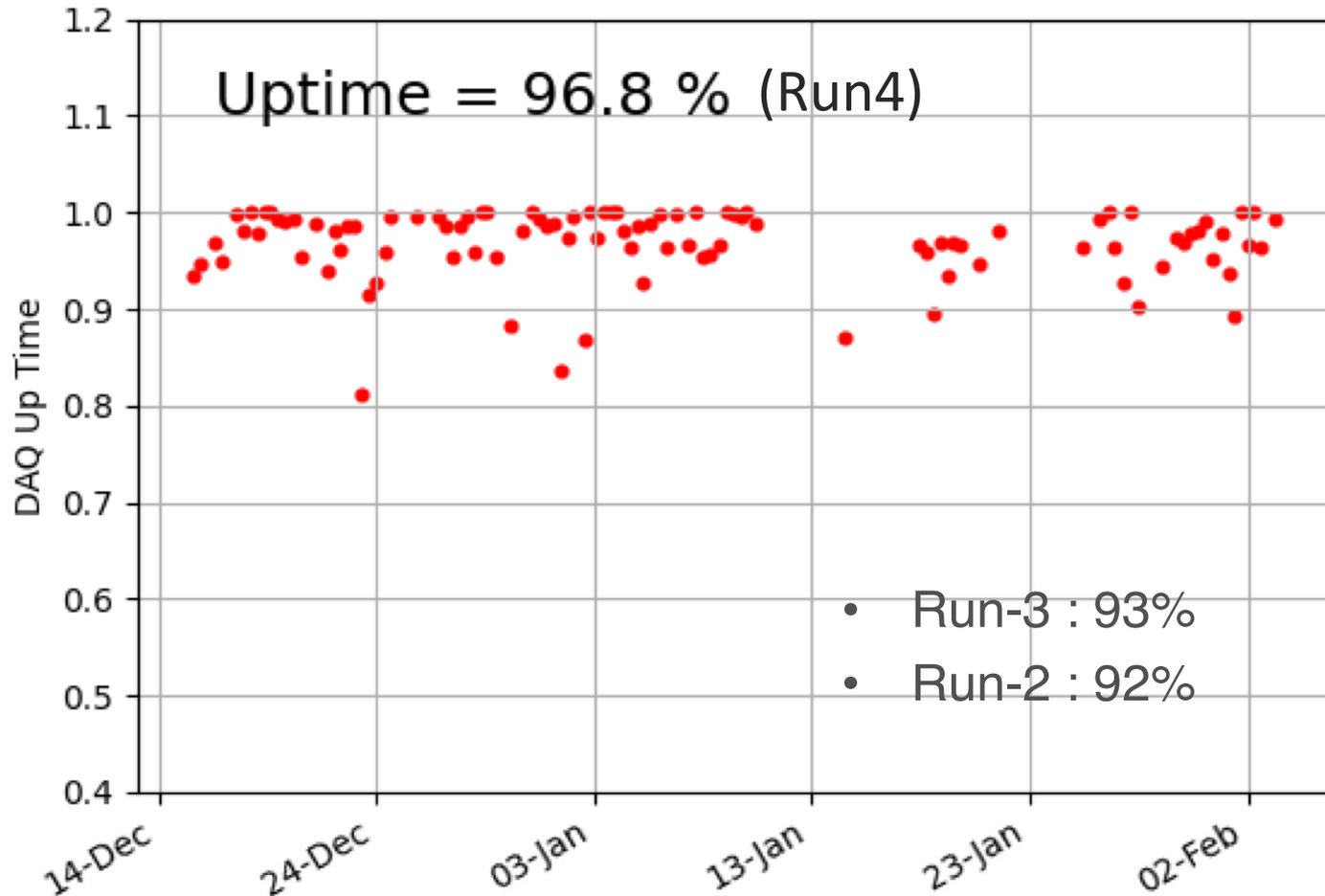
Statistics to date

- Collected about 1.4xBNL during Run 4
 - Production = 1.3, Systematic = 0.04, Test/Ignore = 0.06 xBNL



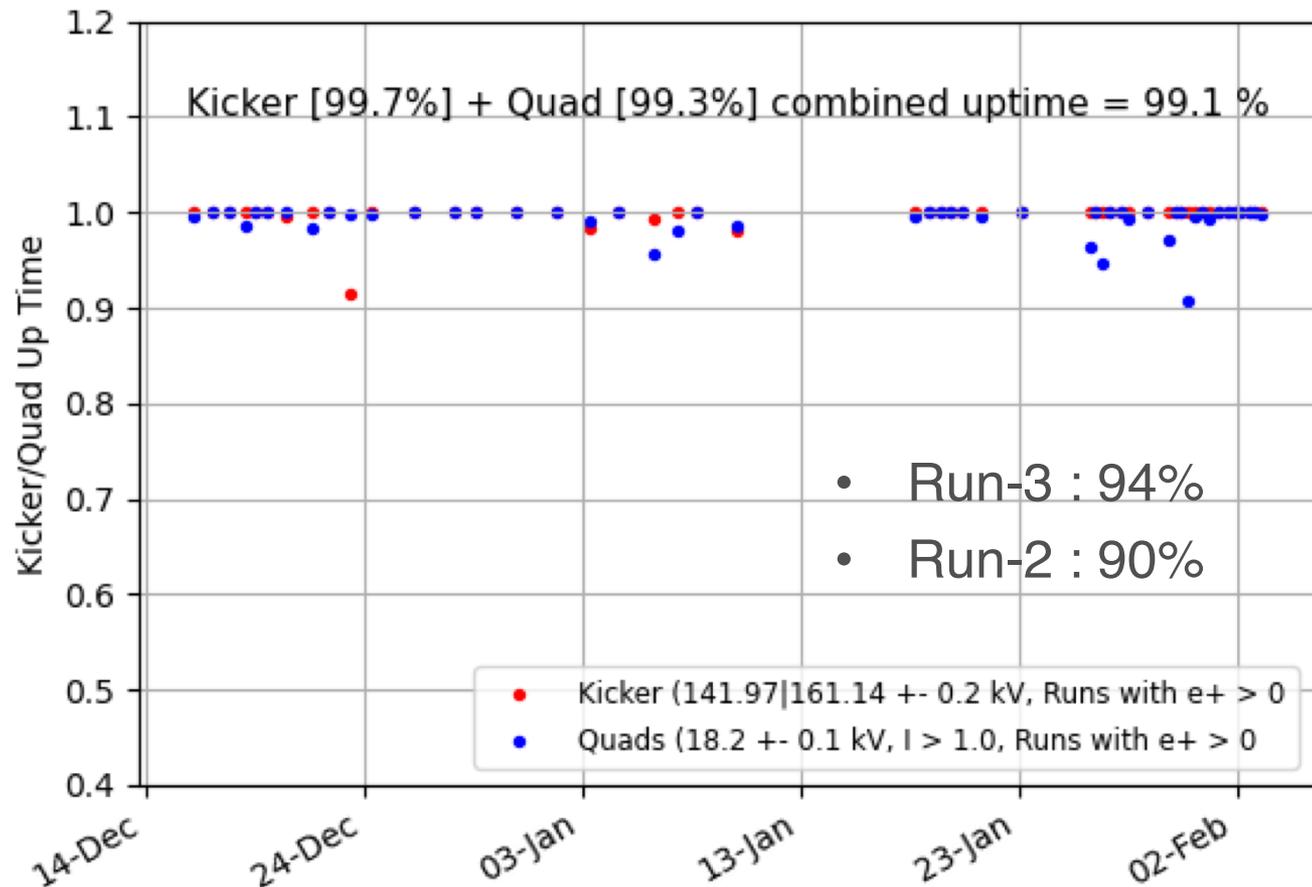
g-2 performance: DAQ Uptime

- DAQ very stable thanks to many improvements introduced during the summer shutdown and during the run



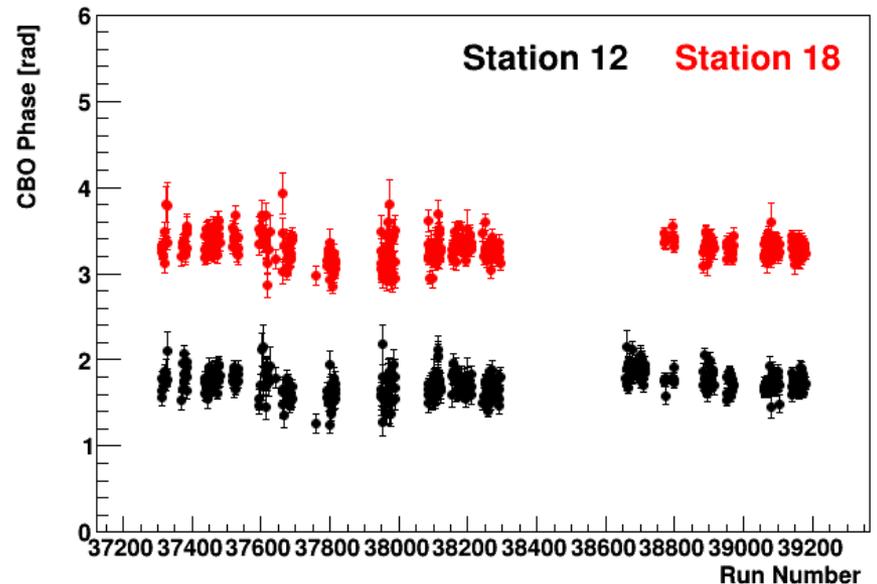
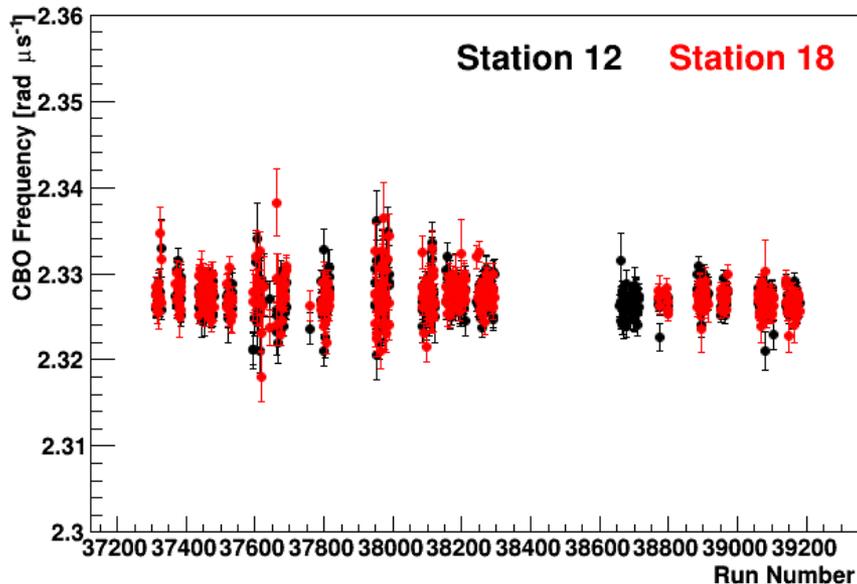
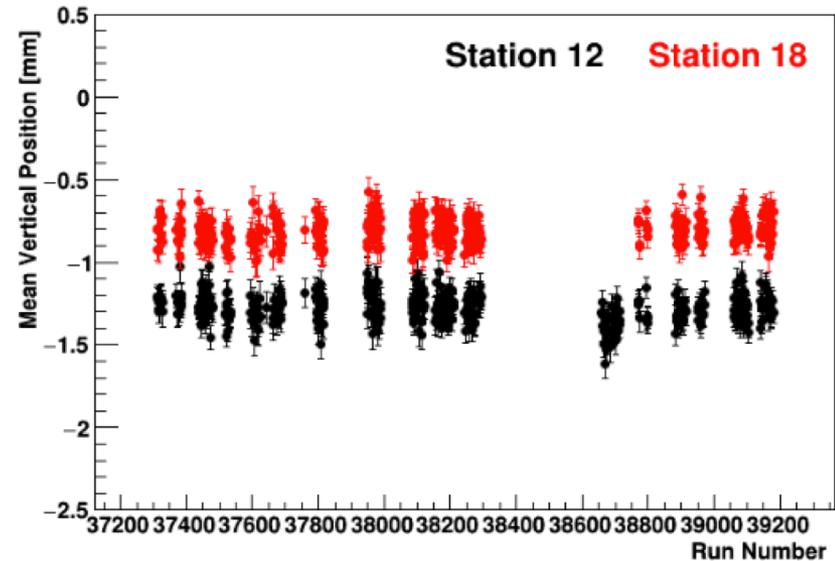
g-2 performance: Kicker and Quads uptime

- Kicker and quads are performing very well and sparking much less frequently: up time 99%



g-2 performance: Beam Position & CBO Trends

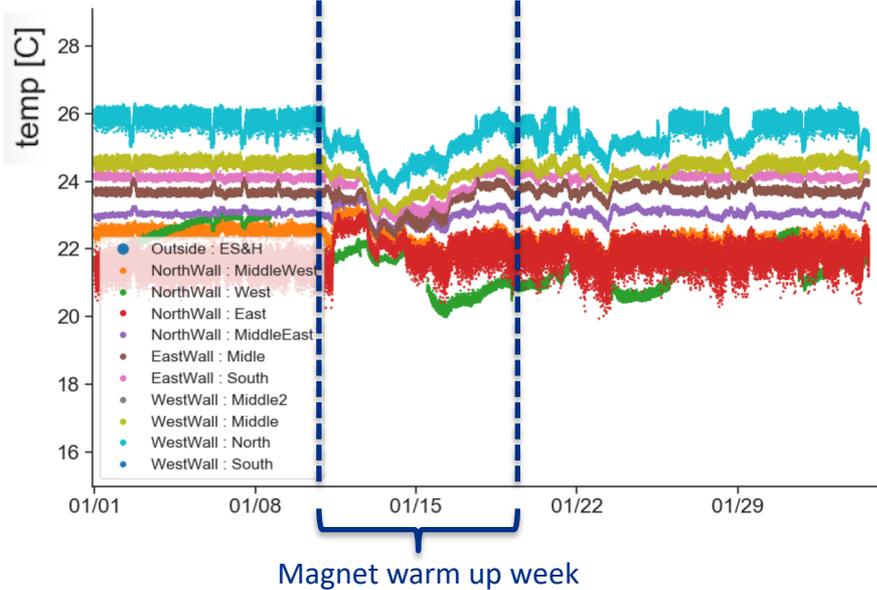
- Main beam dynamics parameters measured by trackers look stable over time



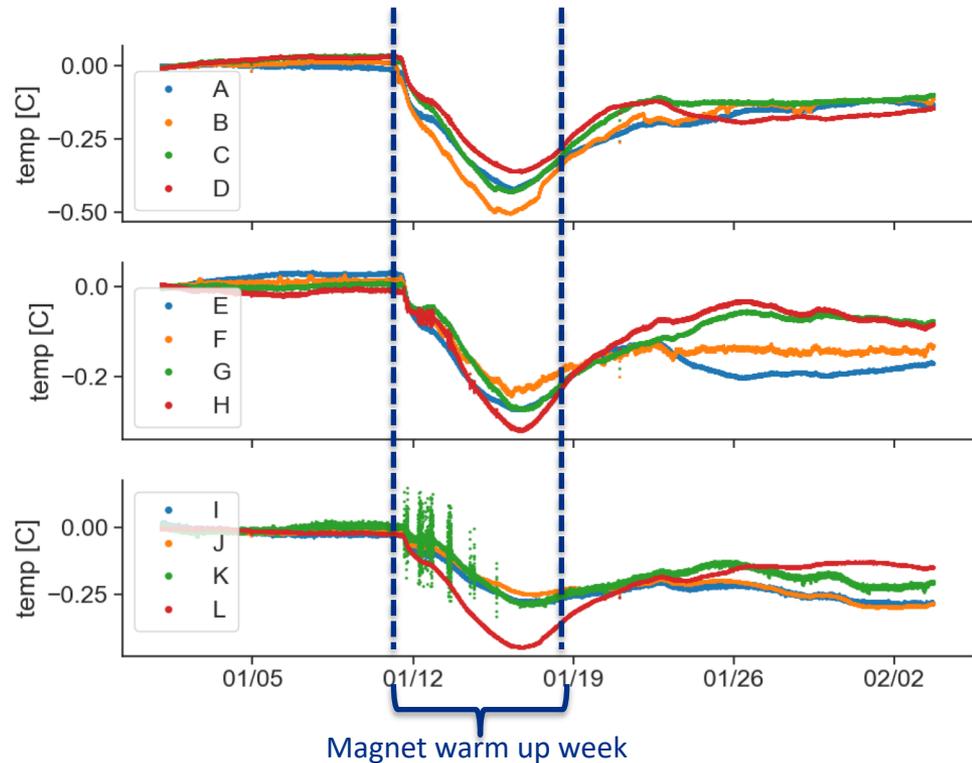
Temperature Stability

- During production: hall temperature within 1°C and magnets yokes temperature stable

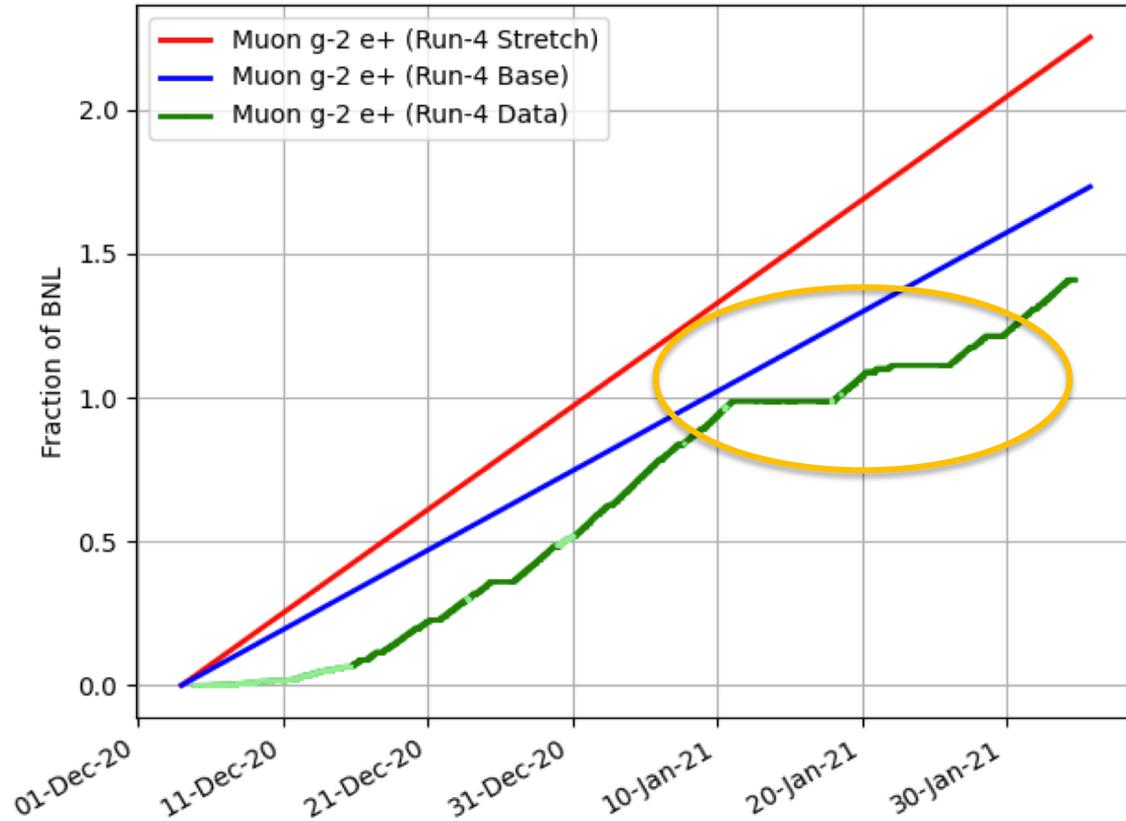
Hall



Magnet Yokes

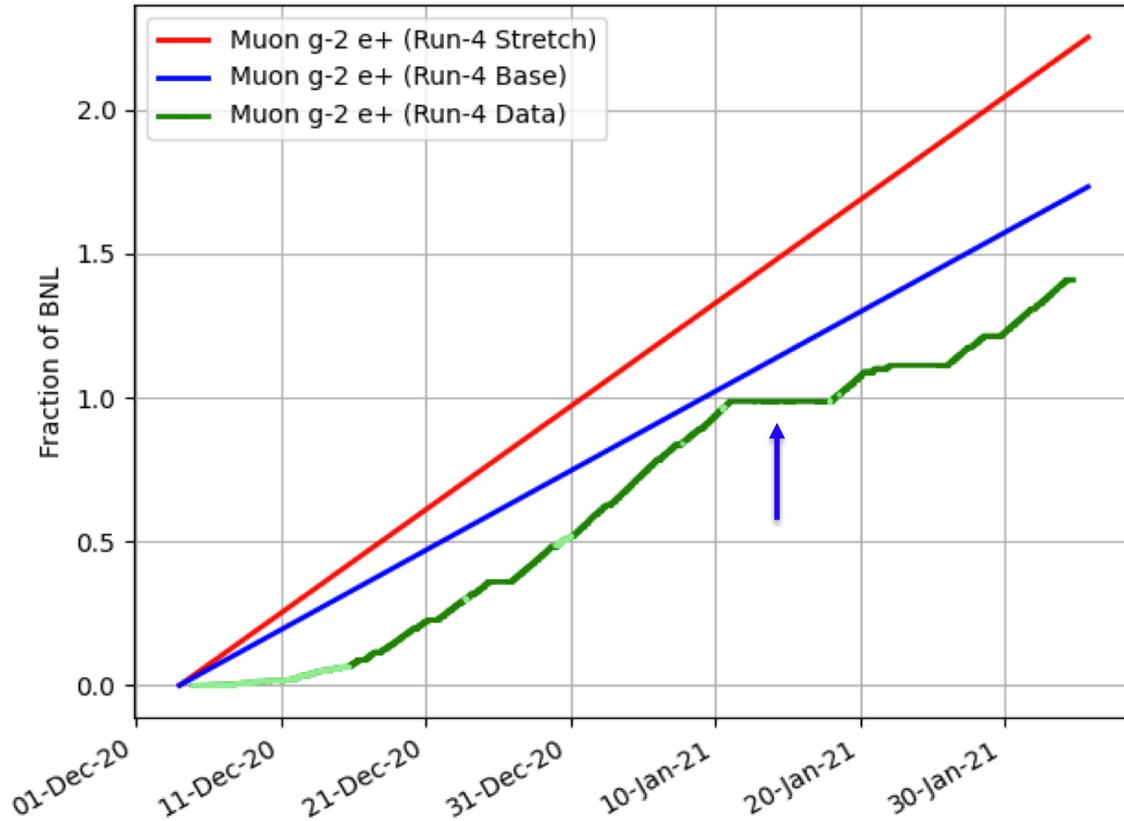


g-2 performance: downtimes since last PMG



- The careful observer would note a few downtimes since the last PMG...
- Go to next pages
→ → → → → → →

g-2 performance: cryo downtimes (1/3)



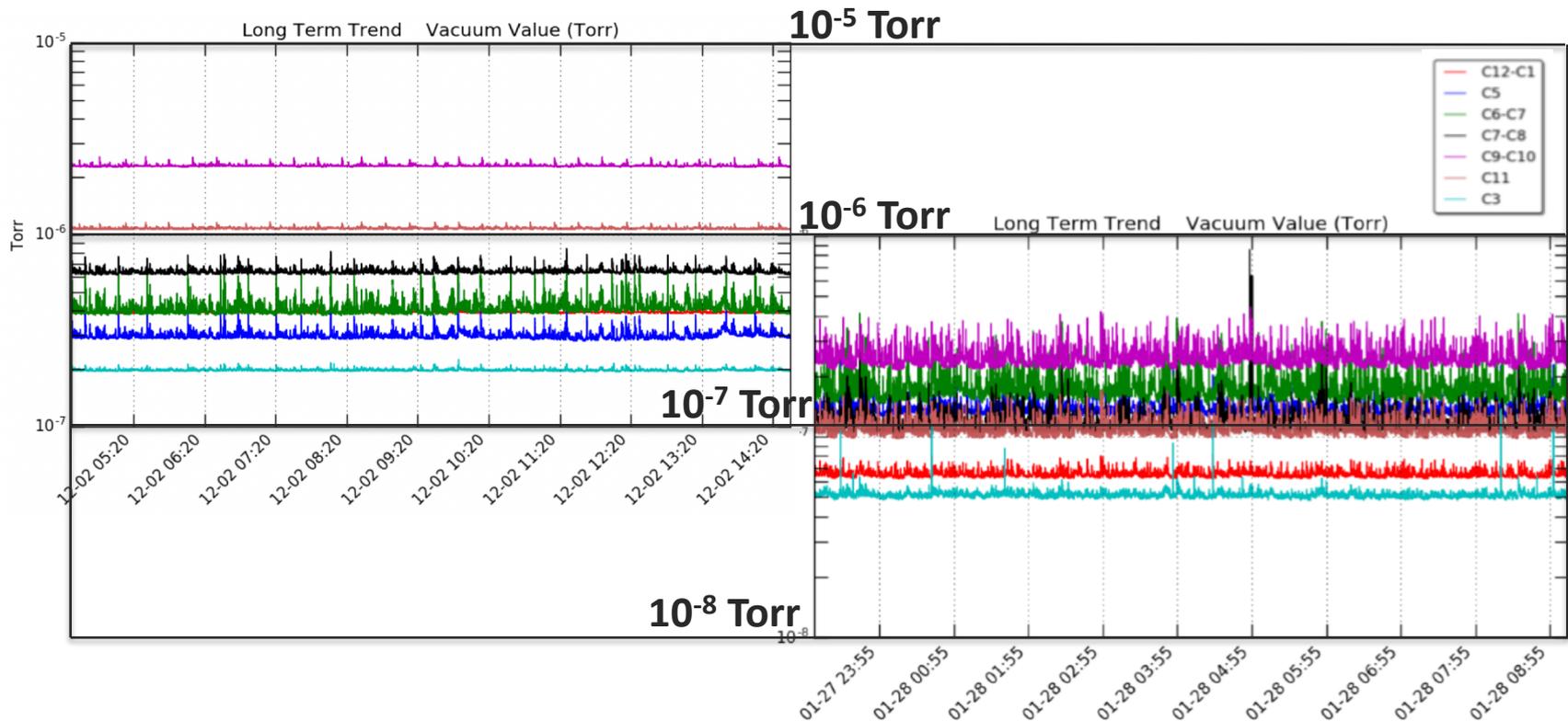
- 11 – 17 Jan: Planned 80K purification cycle, replacement of leaking Tracker modules, repair Fiber Harp signals, Quad RF update, work on laser, field, ...
 - PIP-II work on A0 compressor ICW line also done this week... thank you for accommodating our schedule

Storage ring vacuum improvement

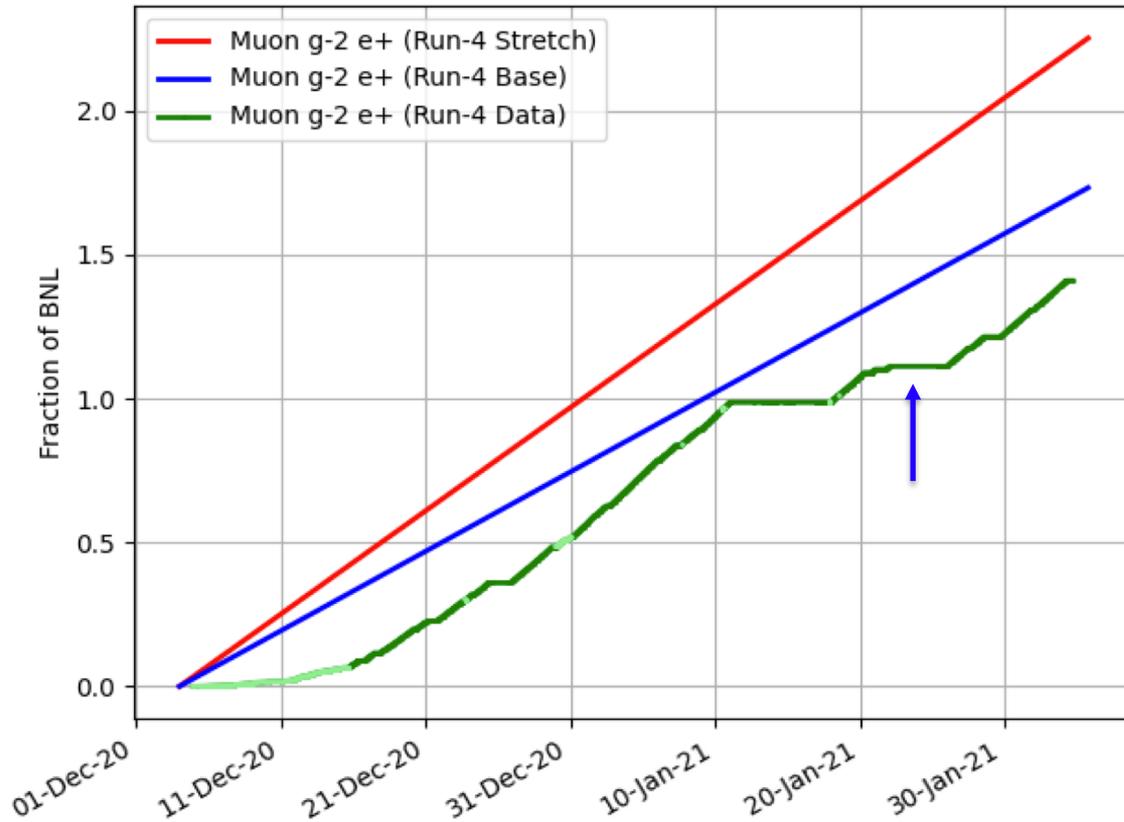
- In the shadow of the purification cycle, we replaced two leaking tracker modules \rightarrow vacuum improved by a factor 10 after modules were replaced

Before tracker modules replacement

After tracker modules replacement

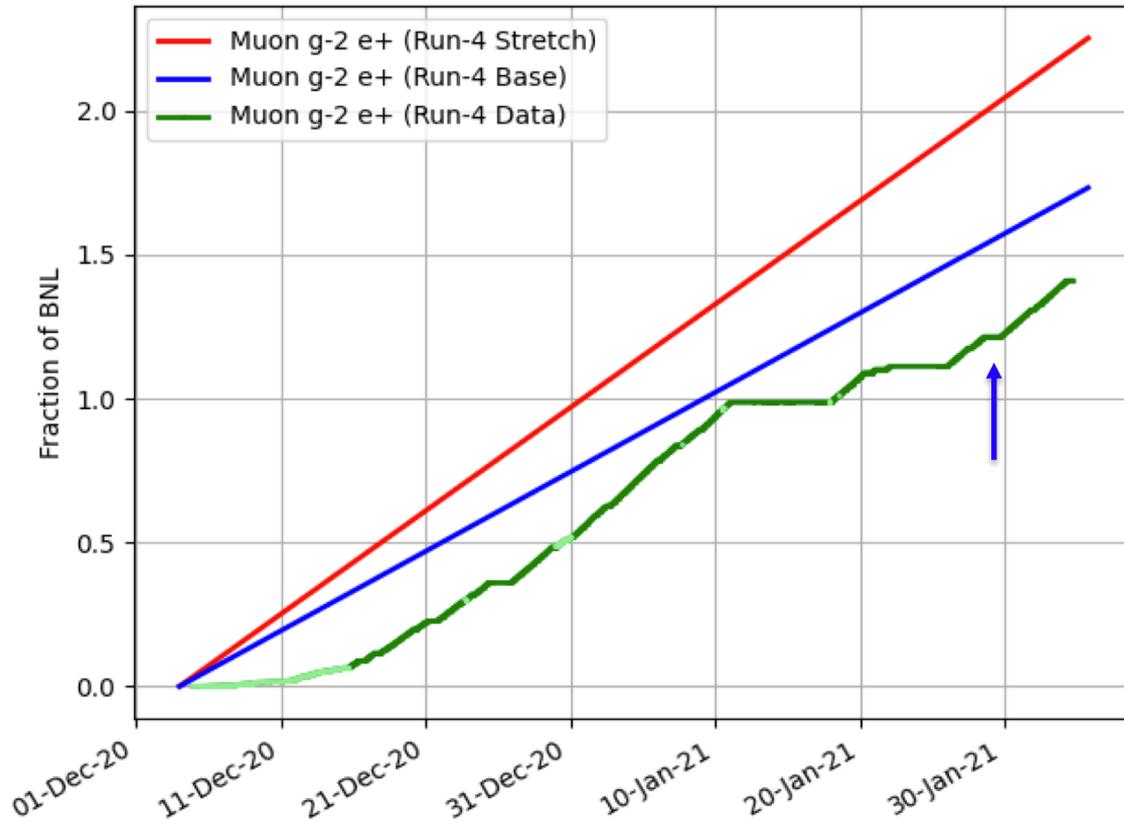


g-2 performance: cryo downtimes (2/3)



- 22 – 25 Jan: g-2 main ring fast dump
 - Quench detection electronics module that developed a fault (unstable instrumentation amplifier voltages)
 - Details in gm2-doc-db-24632

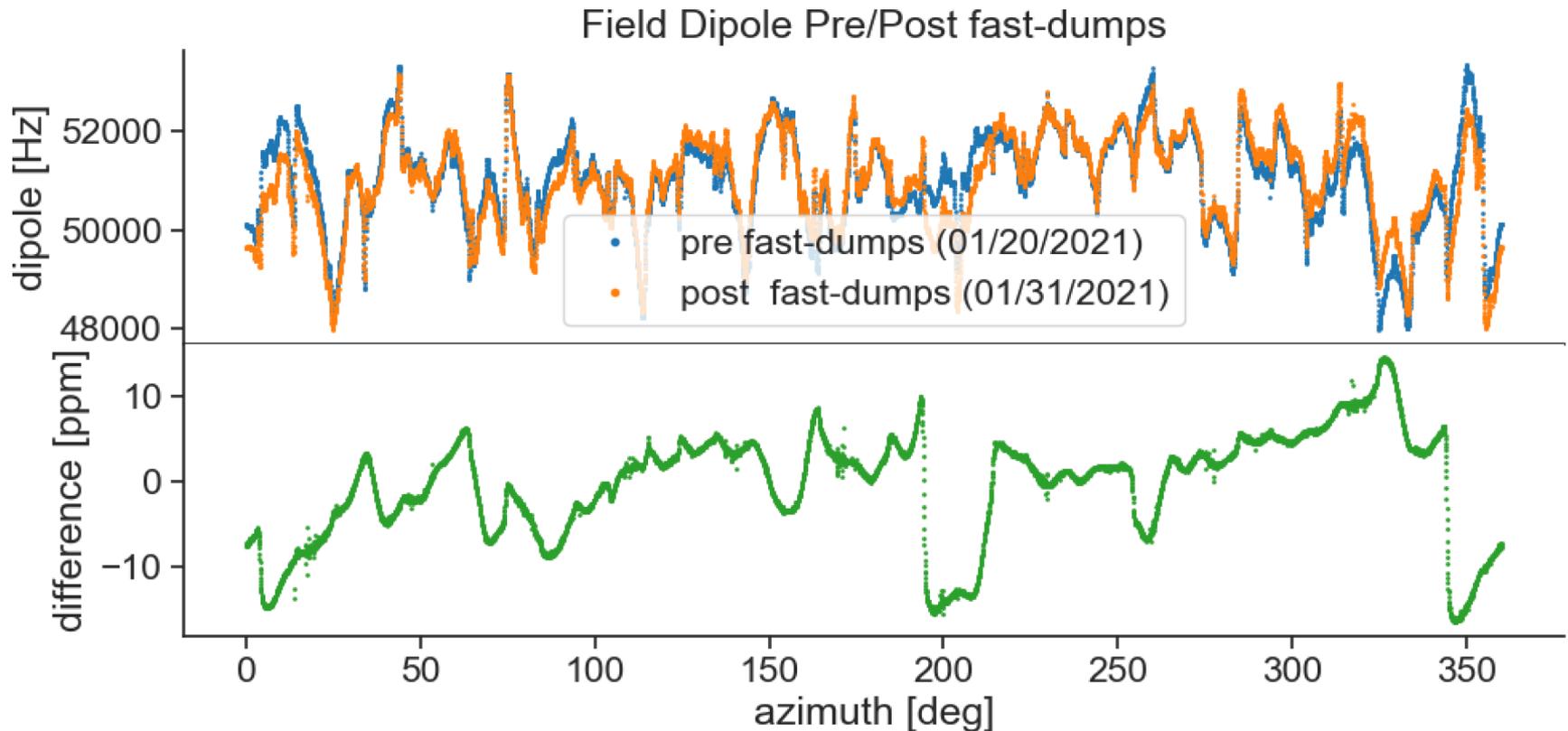
g-2 performance: cryo downtimes (3/3)



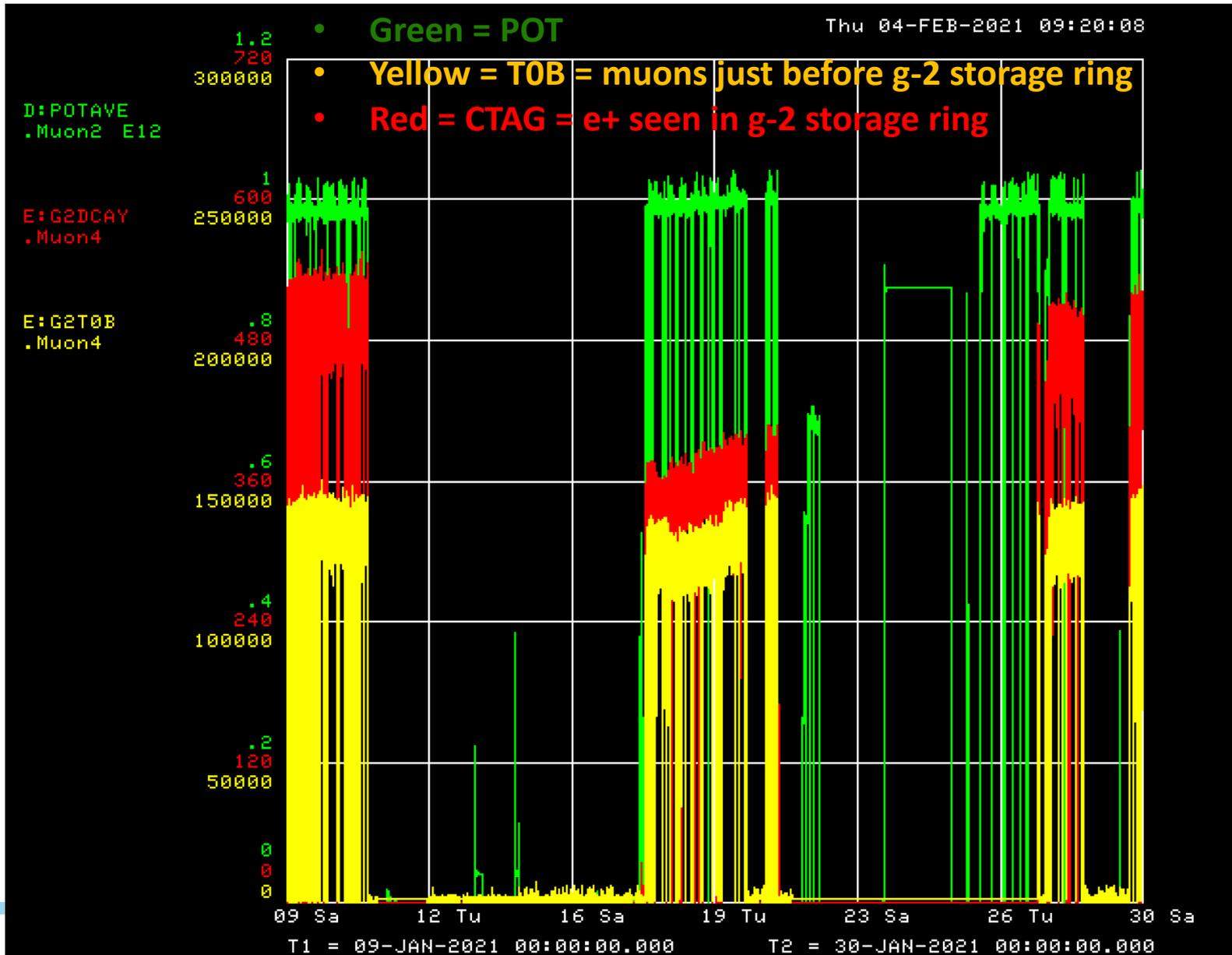
- 28 – 29 Jan: g-2 main ring slow dump followed by fast dump
 - Site-wide power glitch caused engines to trip, which caused slow dump
 - As expected...
 - Then, the wet engine off cryo procedure in the PLC had an incorrect parameter setting, which caused a fast dump at 3000A (30% of energy)
 - Not expected... this parameter now fixed
 - Details in gm2-doc-db-24664

Storage ring field stability

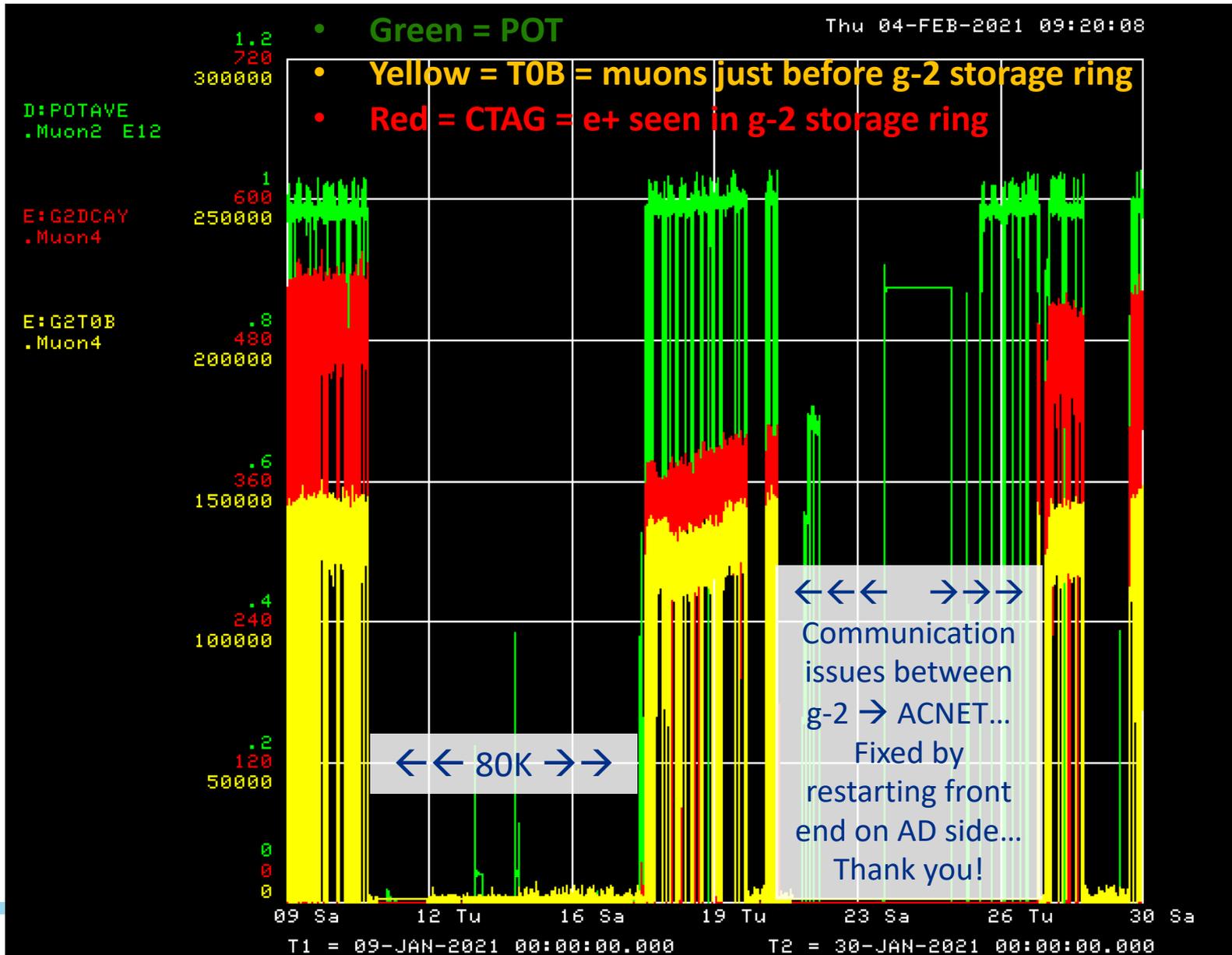
- Field was successfully recovered to previous configuration after magnet dumps



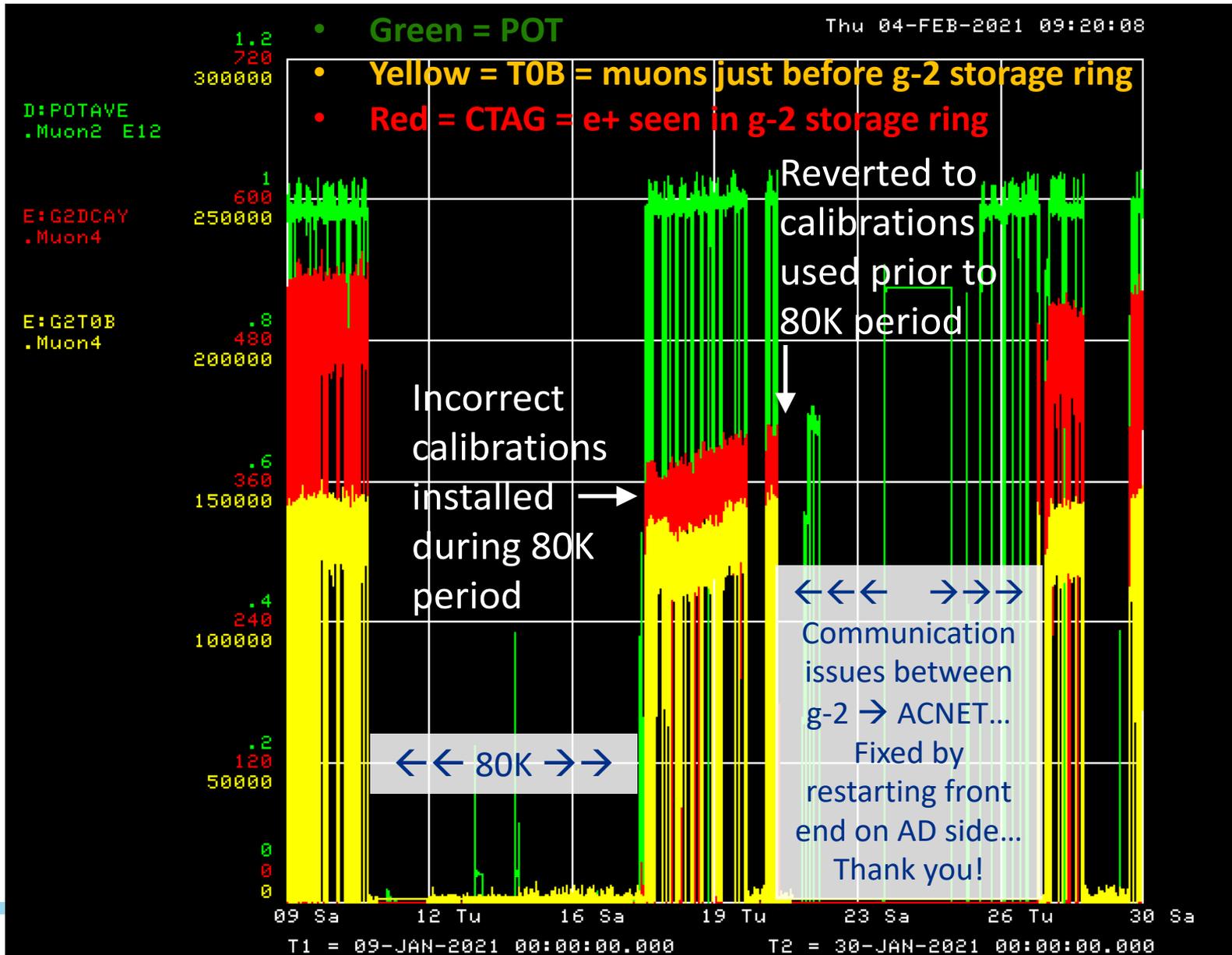
In case you are looking at g-2 in ACNET...



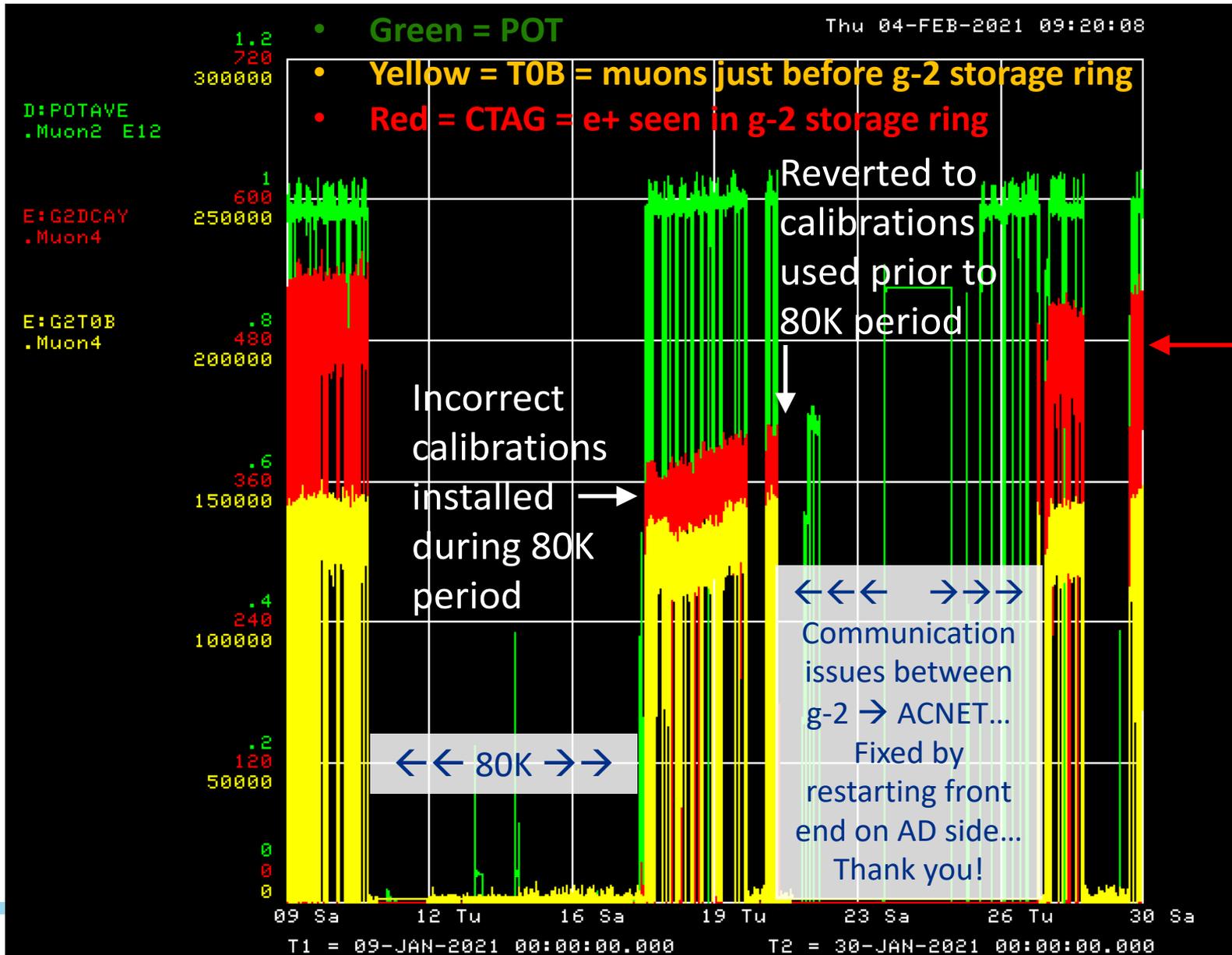
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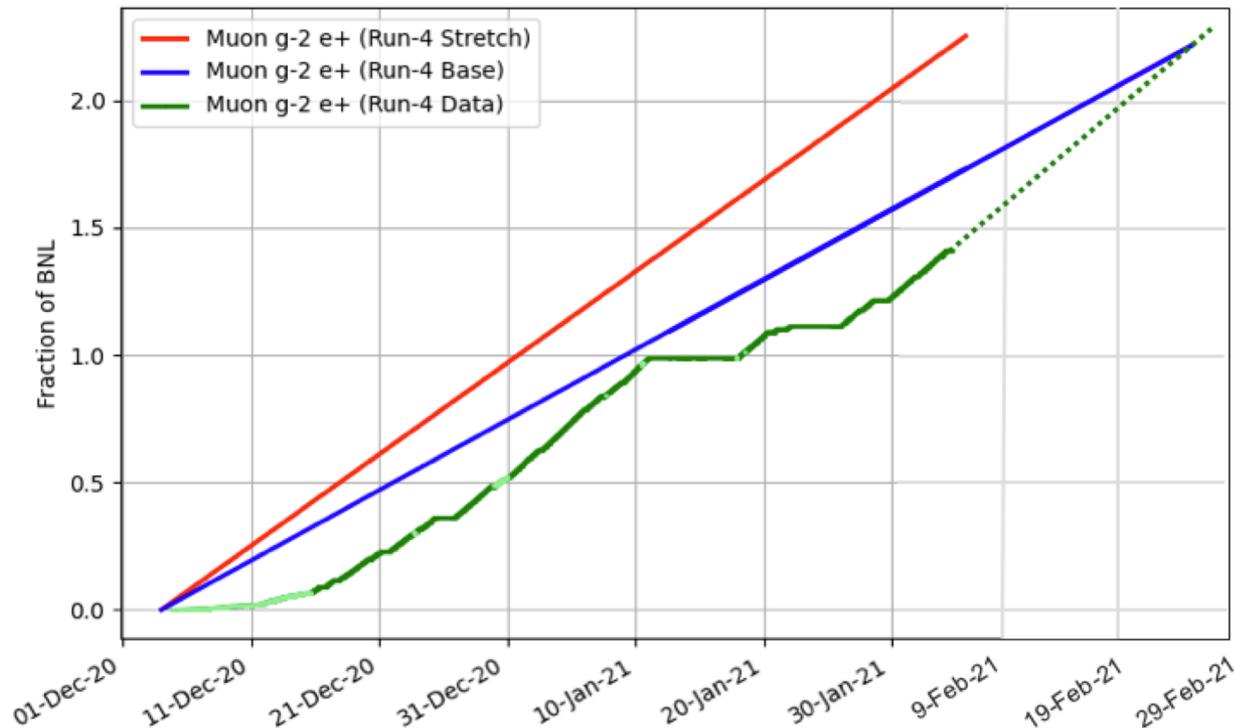
CTAGs low relative to early-Jan...

Tuning by Jim did not fix it...
(thanks for trying!)

Under study...

February Outlook

- Assuming February performance is similar to December, we will be on track to catch up with the blue line...



Wish us luck!