



Muon g-2 update and plans for startup with limited on-site personnel

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Proton PMG Meeting

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Computing Update

- Run2 : 67% completed
- Productions for the Run2 and Run3 have stopped
- Experiencing problems with the Conditions Database
 - Appeared after the June 15, 2020 computing downtime
 - Purely coincidence
 - SCD and g-2 are working together to resolve the problem
 - Problem : Production jobs die when trying to connect to the database server
 - Eliminated obvious networking and server problems
 - Adding additional debugging information to find the problem

Shutdown work

- Status of shutdown work
 - Completed of absolute calibration of main magnet
 - Completed laser magnetometer measurements of residual eddy currents induced by kicker field (needed for Run-1 result)
 - Installed and initial tests of fiber magnetometer (Run-4)
 - Established correlation of transient fields (seen with magnet fixed probes) with vibrations of quadrupole plates
 - Tested technique to mitigate transient fields, to implement during warm-up
 - Proceeding well on process systems + summer shutdown maintenance of magnet/cryo systems
 - All computing systems ~nearly finished major upgrades from SLF6 to SLF7
- 03 – 31 Aug: cryo system at 80K (magnet off)
- Remaining summer shutdown work
 - Continue process systems + summer shutdown maintenance of magnet / cryo
 - Complete computing upgrades.
 - Implement and test quad/fixed probe mitigation
 - Install more fixed probes in inflector region (lesson learned from Run-1 analysis)
 - Perform remaining preparation for Run-4 production running

Muon g-2 running pre-COVID

- Until Feb 2020, ran with 3x shifters in MC-1
 - 1x Ops shift (FNAL PPD tech): monitor cryo, magnet, vacuum systems, and respond quickly to off-normal developments that could threaten detector / magnet
 - 2x Experiment shift (collaboration): operate and monitor 5 different DAQ systems, detector systems, pulsed systems, monitor magnet field, ...
- Recall g-2 SOP: regularly stop beam to do systematic studies
 - E.g., a data collection period must be bookended by “trolley runs” to validate quality requires 2x experts physically at MC-1, with help from Experiment shifter
- As COVID ramped up in Asia and Europe, big effort in Feb 2020 to reduce to 2x shifters in MC-1 + 1x (experiment) shifter remote
 - Remote shifter responsibilities: DAQ running, DQM monitoring
 - If problem seen that requires action, remote shifter must contact MC-1 shifter
 - MC-1 shifter responsibilities: control & eyes/ears of the experiment, e.g.,
 - Start of shift checklist has a lot of “putting eyes on systems”
 - Perform action to recover from kicker spark, quad spark, recover DAQ, ...
 - Help with trolley runs
 - In some cases, the technologies to solve problems were chosen assuming an experiment shifter in MC-1

Muon g-2 summer shutdown work has continued uninterrupted since the beginning of the COVID era

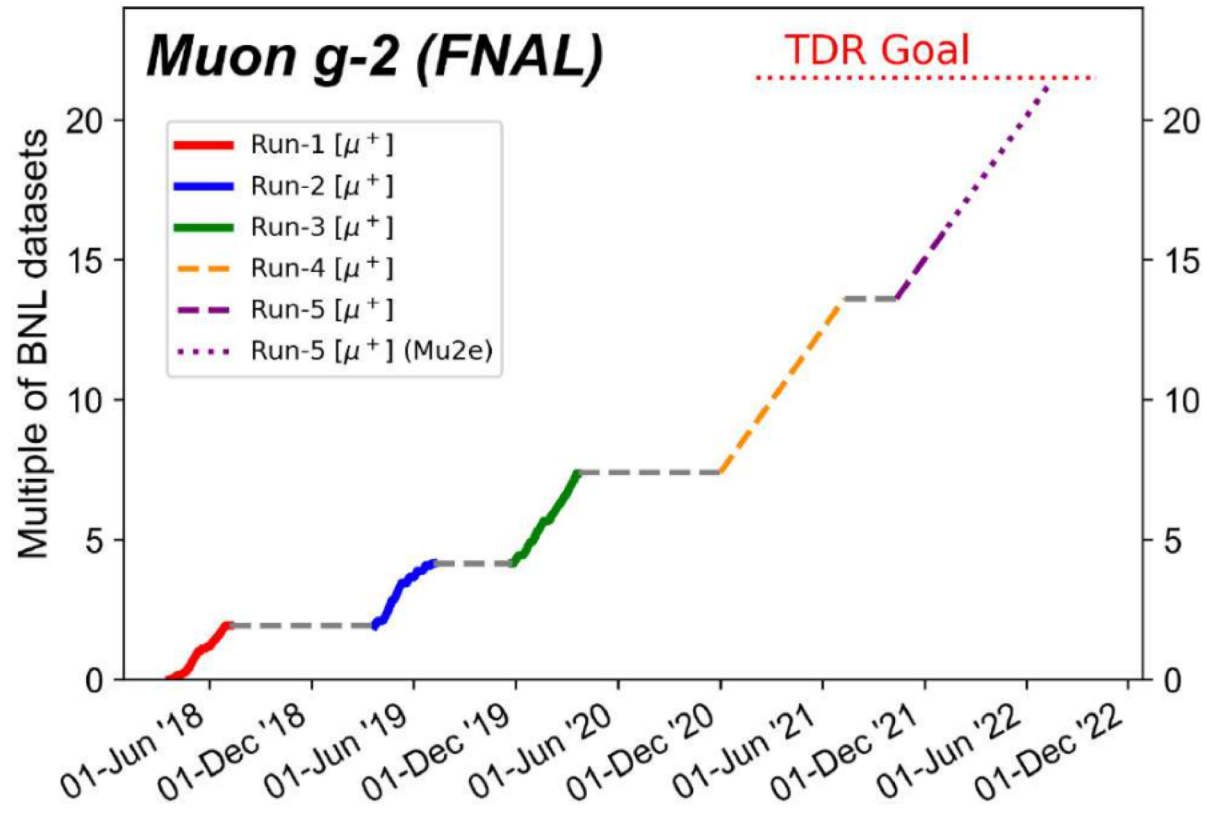
- Muon g-2 knows how to work safely in the COVID-era
- g2-doc-db-22624 describes the procedures for COVID followed at g-2
 - Explicit planning to avoid overlap of work
 - Written COVID-JHA in place that is signed by everybody entering the building
 - Explicit reminder of the FNAL policies
 - Strict control of who is in building
 - Before performing work, call Run Co and notify Ops shifter
 - Contact tracing
 - Ops shifter records entry and exit time

Tentative plan towards startup w/ limited personnel

- Begin Run-4 as at end of Run-3 (2x shifters at MC-1 and 1x shifter remote)
 - Run Co training planned for next week
 - Poll shifters to see if collaborators are willing and **able** to come to FNAL
 - May need to ask FNAL-based collaborators to take more shifts at start, if willing
 - The result of this exercise may determine the urgency with which we...
- Evaluate what would be needed to move the other experiment shifter remote
 - Delineate roles and responsibilities of ops shifters and experiment shifters and ensure the duties of the experiment shifters do not fall onto the operations shifter
 - List activities that need physical presence in control room
 - List activities that would need additional administrative controls to go remote
 - List activities that would need additional engineering controls to go remote
 - List (rare) activities that might require multiple people in MC-1
 - E.g., multiple problems happening simultaneously
 - Inquire with expert shifters about what could already be done remotely
 - ... and check if non-expert shifters could also do those things remotely...
- Some issues to address...
 - Both MC-1 shifters and on-site experts will need to be on essential list
 - Training will be complicated (RunCo's shadow shifts in Sept... by zoom)
 - Implement logistics of MC-1 experiment shifter and ops shifter

Stats recap and projection

- Recall: through Run-3, accumulated total 7.37x BNL



- Expect to reach total $\gtrsim 13x$ BNL by the end of Run-4
 - Assuming 01-Dec-2020 start date for g-2 production running