Collaboration Response to the Charge

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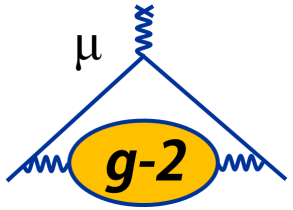
g-2 Computing Review

November 7, 2016

The Charge

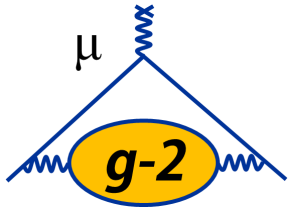


1. The current offline computing infrastructure and tools, including build and release tools, simulation tools, framework, analysis tools and approaches, database, workflow, workflow management, data management, and operations. Is the experiment efficiently leveraging tools and expertise offered by SCD? Does the experiment have sufficient resources to implement, deploy and operate the infrastructure?

2. The current online computing infrastructure and tools, including DAQ systems for the precession frequency measurement and the magnetic field, online monitoring, nearline analysis for data quality checks, database and slow control monitoring. Does the experiment have sufficient resources to implement, deploy and operate the infrastructure? Is there enough familiarity with the experiment's approaches and solutions in SCD to be able to provide expert consultation if necessary?

3. Are the tools, infrastructure, and established processes sufficient to engage non-expert resources from the collaboration? Are best practices employed in these processes?

Color Coded Responses Sorted by Presentation

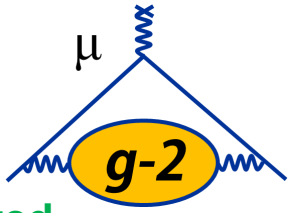


✓ **Completed Tasks.**

○ **Tasks that are not yet complete, but internal resources exist to complete the task according to schedule.**

– **Tasks or initiatives that the collaboration needs to complete, but may not be able to without external assistance.**

Offline Ecosystem *- charge #1 and #3*

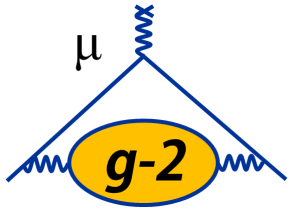


✓ **Our Art infrastructure is based on existing in-house tools and has facilitated the rapid development of the offline software infrastructure. This infrastructure has been extensively tested thanks to comprehensive SLAC and FNAL test runs.**

- **The collaboration will (but has not yet) :**
  - **A. Setup a unified database structure, but see below…**
  - **B. Implement the offline magnetic field analysis infrastructure.**
  - **C. Appoint a dedicated release manager.**

– **The collaboration needs :**
  - **A. Continued support of database applications, and implementation, especially for calibration constants.**
  - **B. Offline access to archived accelerator ACNET data**
  - **C. To improve development workflow by moving to CMS-like github single repository.**
  - **D. To improve code testing by implementing unit testing for critical code and continuous integration.**
  - **E. The Art team to complete the Make-Study usability improvement.**
  - **F. Help with Open Science Grid production**

Simulation Overview - *charge #1*

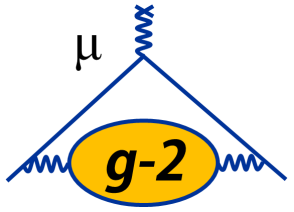


- ✓ The unique g-2 storage ring geometry has been implemented in gm2ringsim. You will see tomorrow that extensive and complete simulations of the beamline before injection have been completed.

- ○ The collaboration will (but has not yet) :
  - A. Update the fringe fields and implement the inflector fields as well as time dependent quad and kicker fields.
  - B. Produce a large simulation sample for muon loss and beam dynamics studies.

- – The collaboration would welcome :
  - A. A senior scientist to help students and postdocs bridge the gap between simulation and physics analysis.

Online + Data Acquisition System – *charge #2*

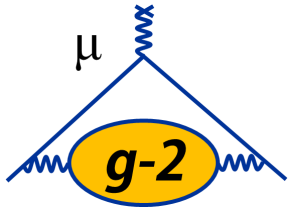


- ✓ **The calorimeter and tracker DAQs are highly developed. They have been tested extensively and meet specifications for data taking.**

- ○ **The collaboration will (but has not yet) :**
  - **A. Complete the magnetic field DAQ system.**
  - **B. Form a DAQ operations team.**
  - **C. Organize a DAQ training workshop in February once the hardware is complete ~Jan 2017.**

- – **The collaboration needs :**
  - **A. Expertise for ACNET integration into Data Quality Monitoring.**
  - **B. To improve the Data Quality Monitoring system web display.**
  - **C. To unify and expand existing alarm handlers. Survey of existing solutions at other experiments would be useful.**

Algorithm Development – *charge #1 and #2*

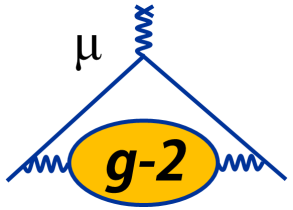


✓ **Calorimeter pulse fitting, clustering and calibration routines have been extensively tested and are mature. Tracker track-finding and fitting routines are in development.**

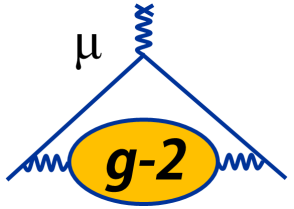
- **The collaboration will (but has not yet) :**
  - **A. Finish developing and testing the online and offline Q-method algorithms**

– **The collaboration needs :**
  - **A. External tracking expertise to develop efficient and fast tracking algorithms within our non-uniform and time varying magnetic field region, in time for first production.**

Priorities *– only red tasks*



1. External tracking expertise to develop efficient and fast tracking algorithms in time for first production.
2. Continued support of database applications and implementation.
3. Offline access to archived accelerator ACNET data.
4. Help with Open Science Grid production.
5. A senior scientist to help students and postdocs bridge the gap between simulation and physics analysis.
6. Unify and expand existing alarm handlers.
7. Improve development workflow by moving to CMS-like git-hub single repository.
8. Improve code testing by implementing unit testing for critical code and continuous integration.
9. Incorporate the Make-Study usability improvement.
10. Expertise for ACNET integration into Data Quality Monitoring.
11. Improve the Data Quality Monitoring system web display.



Thank you!