



Muon Research at Fermilab

Brendan Casey, Muon Department Head

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Muon g-2 and Mu2e

Muon g-2



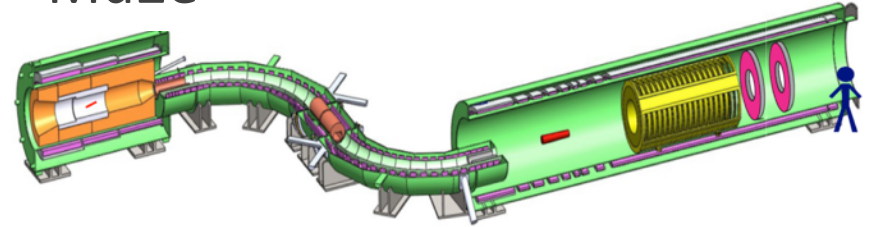
Goal is to measure muon's magnetic moment to 140 parts per billion accuracy

4 fold improvement over the previous result from Brookhaven.

If the current central value stands, it will increase to close to an 8 standard deviation discrepancy with the Standard Model

Data taking began at the end of FY17. First publication is expected soon.

Mu2e



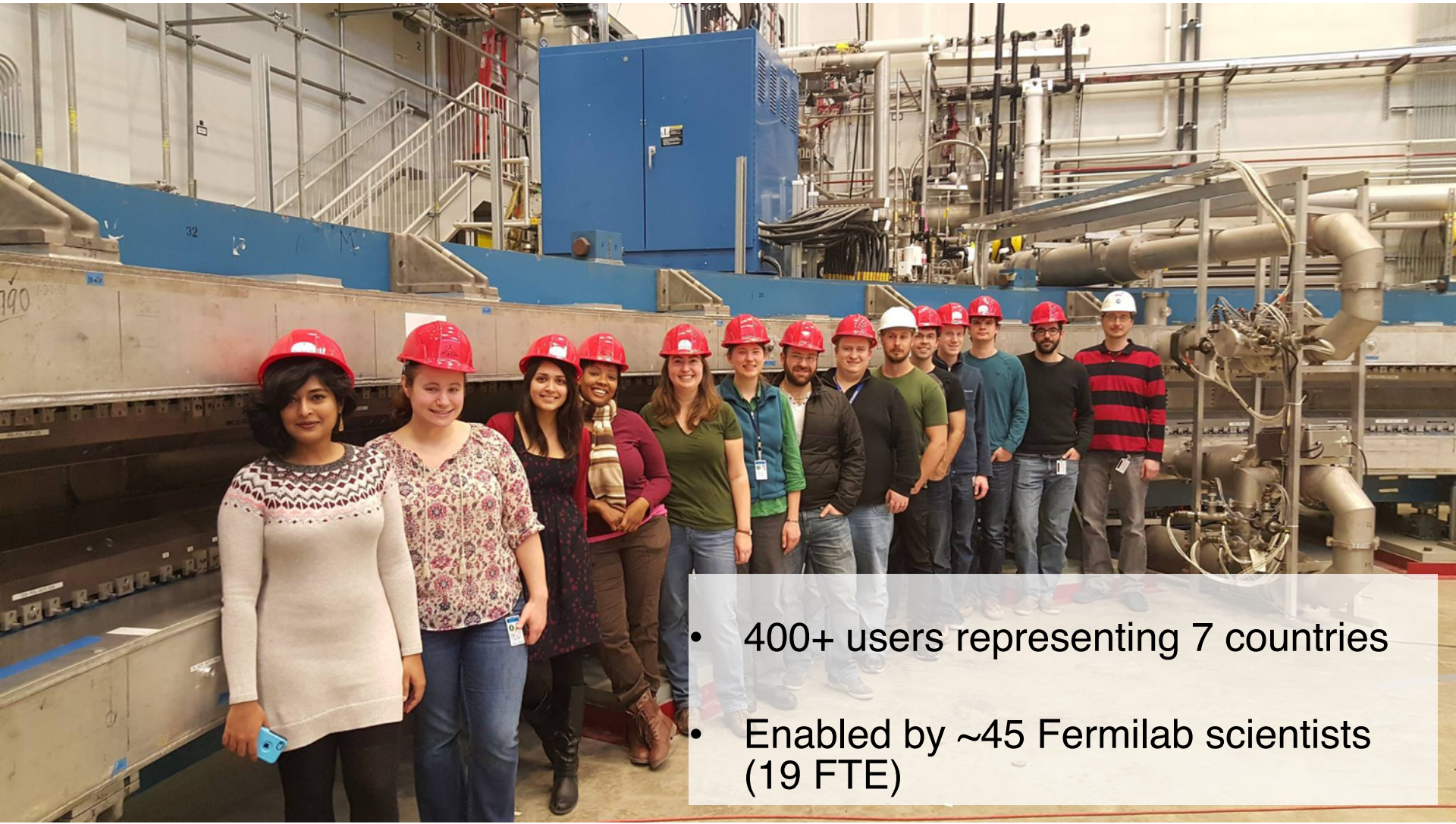
Goal is to achieve the world's highest sensitivity for charge lepton flavor violation

Factor of 10,000 improvement in sensitivity for muon to electron conversion in the field of a nucleus

Under construction since FY18. Many components have already arrived at Fermilab. Many more arriving in FY21

Cosmic data taking begins FY23, commissioning run in FY24.

Muon Community

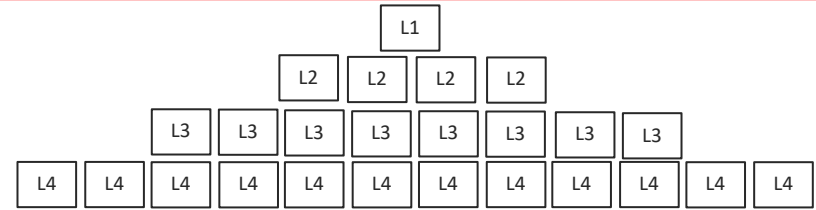


- 400+ users representing 7 countries
- Enabled by ~45 Fermilab scientists (19 FTE)

Work funded by the Research B&R (prioritized)

1) Project Support

Fermilab scientists are integral parts of designing, planning, and executing construction projects of experimental facilities



2) Collaboration Leadership

Fermilab scientists have founded this program and currently co-lead the program with University users



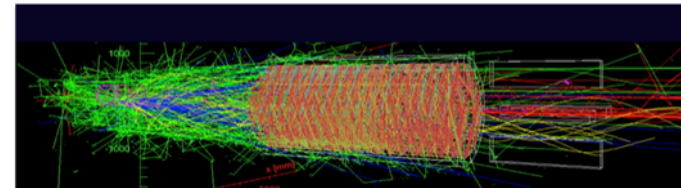
3) Technical Leadership

Fermilab scientists build, maintain, and understand complex experimental instrumentation



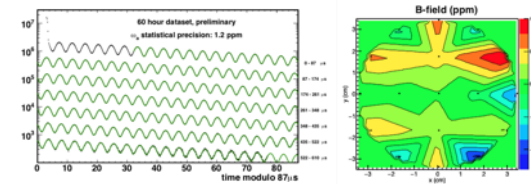
4) Computing Leadership

Fermilab scientists process petabyte size data sets, author and maintain reconstruction algorithms, and provide simulations to support data analysis



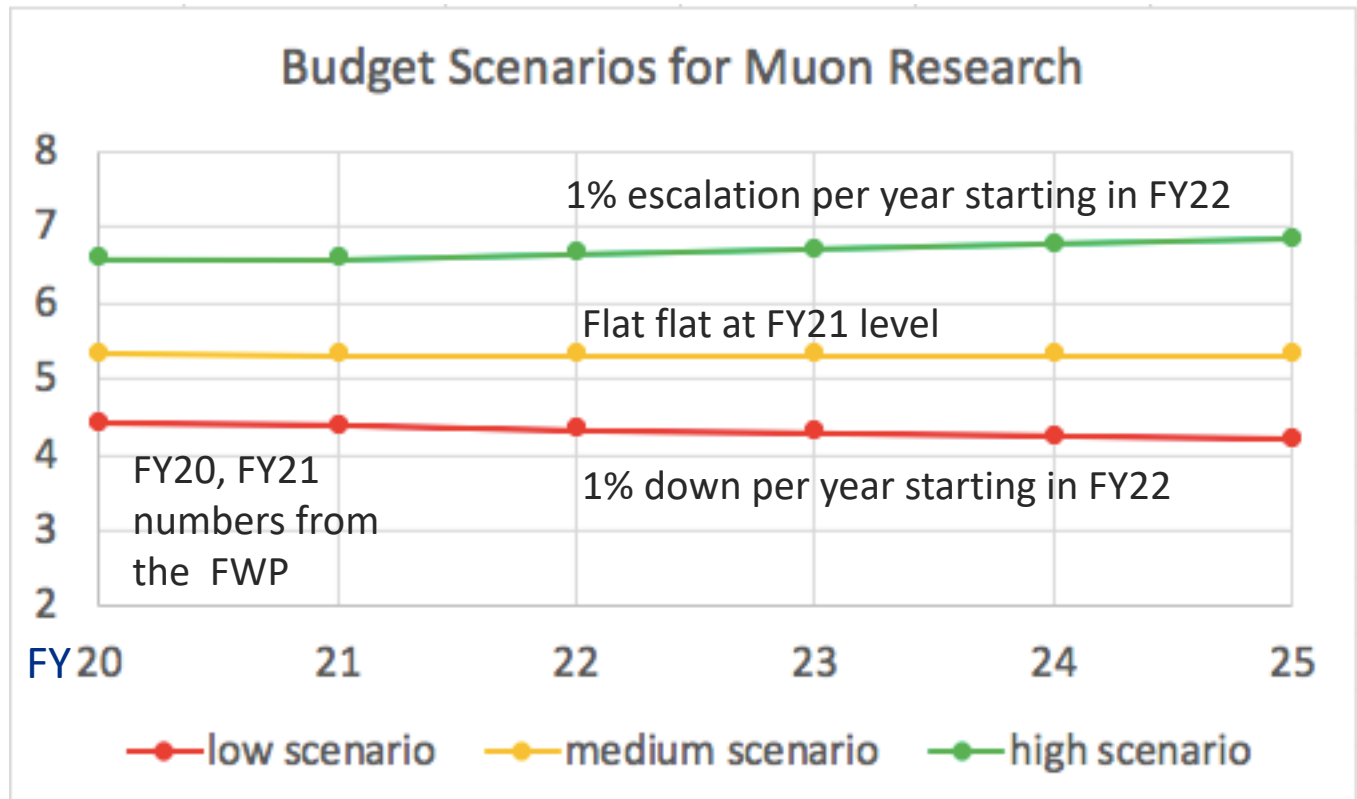
5) Analysis Leadership

Fermilab scientists are experts in extracting physics results from complex data sets, lead many physics working groups, and mentor graduate, undergraduate, and high school students



Fall 2019 Strategic plan

SWF (\$M)



- We had a \$2.2M shortfall between the FY19 actuals and the FY20 expected funding
- We prioritized work and removed FTEs from the lower priorities (without zeroing any priority out) to fit into 3 different scenarios and presented these to the DOE in September 2019
- The DOE provided supplemental funding (~1M) to get us into the medium scenario (Thank you!)

Plan for today

- Three of our Associate Scientists (Assistant Professor equivalent) will provide an overview of work on our priorities with a focus on what they are personally working on.
- Goal is to give you more of a flavor of the work each of us are doing rather than give a comprehensive list of all the work we are doing



Karie Badgley
Project Support and
Technical Leadership



Tammy Walton
Computing
Leadership

James Mott
Analysis
Leadership

