



Search for Charged Lepton Flavour Violation at Mu2e



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Hints from FNAL Muon g-2 and LHCb that muons may not be behaving as we expect in the Standard Model.

New physics explaining these anomalies could also cause a charged lepton flavour violating (CLFV) transition in muons



CLFV only occurs in SM via neutrino oscillations over tiny distance : it is thus heavily suppressed to 10⁻⁵⁰ level

Thus **ANY** observation of CLFV would be evidence of new physics



Mu2e experiment can probe both dipole and contact BSM interactions to mass scales in the multi-TeV region.

Muon is captured by aluminium and forms a muonic atom and in doing so it emits characteristic X-rays

- Muon can decay as usual emitting e- and neutrinos
- Be captured by nucleus
- **Undergo CLFV and emit e- and NO neutrinos**



Sensitivity of 8×10^{-17} requires ~ 10^{10} muons/sec to interact with the aluminium (stopping) target.

We need to know this rate (like luminosity at a collider) to report a limit (or discovery !)



Muons (< 75 MeV/c) are captured by the aluminium and in that process characteristic X-rays are emitted We detect these X-rays 35m away from the target to "count the muons"



Both HPGe and LABr detectors detect these X-rays via a collimated aperture with a line of sight to the Al-target.

I am working on the DAQ, calibration, simulation and optimisation of this detector.

Developing pulse finding algorithms that can run at MHz rates to determine X-ray energy and identify characteristic peaks



First data from the experiment when Muon (g-2) finishes running in 2023





Thank you !

BACKUP





eµ Higgs anomalous Yukawa coupling limit

More to come









