# g-2 Notes

- Life time (GHz processor)
- Prob mag field NMR + PET
- Quantum fluctuations
  - Quantum realy weird
  - Can disturb mag moment
  - Can predict from all we know
  - Theory to 400 per billion
    Exp 540 per billion
    Go To → 140 per billion

- Each piece of steel moved on a truck
- 10 mph max
- 5K cooled not bad to be outside
- Niobium - titanium
- 1.45 Tesla → MRI machines
- 0.7 Gauss is → 20x ⊕

- Refridgerators (2 compressors for g-2, 2 for mu2e)
- Light bulb vs superconductor
- Medical MRI charged once a year
- LN2 filled a couple times a week

- Mu2e experiment
- penitrations into tunnel

- $\mu \to e$ $10^{-54}$ branching in SM
- Charged lepton flavor non-conservation
- Why can't convert? Conservation of momentum

- Stable to $\pm 1°C$
- Steel expansion $10^{-5}$, $10^{-5}$ m per deg C
- Steel expansion changes B-field

- Expect several PB of data

- Magnet will be off
- Make sure no medical condition
- At 600 Gauss things start sliding
- Not great for brain...
- Field we will experience same as earth
- Railing is safe

- 100 ns beam train
- 3 GeV muons → 150 ns around
- Fills 4/5 of circle.
- Need to kick beam by 7cm so it doesn't hit injection pipe
- 10,000 per pulse about 3-4% acceptance
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- 9cm beam pipe
- NMR to map field
- 1/1000th on an inch adjust
* - Ask Brendan to put out shims
- Length accuracy 25 μm out of 18 cm ~ $10^{-4}$
- B-field accuracy
- Circuit board for small adjustments
- Several 100 (~360) orbits
- $\gamma = 30$ $t = 2.2\ \mu s$ $t = 64\ \mu s$ ~ 360 orbits
- And move shims in and out
- 0.5 mm top → 100 ppm
- Raise air gap → Raise B-field with muons

- Mile long continuous coil
- Prototype of straw tracke
- Anode down the midde
- Argon-ethane
- Get muon beam profile