Overview of the UCN\(\tau\) Experiment

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First Data

- Trap loading system, polarizer/spin flipper, detectors installed
- one week measurement campaign
- all subsystems tested
- background tests, optimization of run cycle timing
- storage measurement performed
- V activation detectors tested
- up-scattering from UCN cleaner tested
The Experiment
Fill & Monitor \( (t \sim 200 \text{ s}) \)
Clean \((t \sim 30 \text{ s})\)
Store \((t \sim 100 \text{ to } 2000 \text{ s})\)
Fill and Empty Measurement

![Diagram showing time intervals for different processes like cleaner, shutter, trap door, GV, and beam.](image)

![Graph showing UCN monitor counts over time.](image)
Storage Time

Fill-and-dump Storage Measurement

\[ \tau = 860 \pm 19 \]

\[ \chi^2 / DOF = 0.89 \]
- up-scattered neutrons can be detected
- improved efficiency/background reduction forthcoming
- need to separate sources of up-scattering
Absorb ($t \sim 30 \text{ s}$)
Vanadium Detector

- Nal
- Plastic
- V
- Plastic
- Nal

Graph showing counts over time for run 160 with 100 s storage time.
Conclusions and Next Steps

- storage time good
- no holding field storage time poor
- guide transport/polarimetry improvements needed
- vanadium detector S/N improvements needed
- up-scatter measurements a promising handle
- polarimetry and guide transport studies
- new loading door being designed
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Detector/DAQ upgrades

- Phoswich
- waveform digitizer
- cosmic ray veto
- More NaI

Improved guides and improved source performance
⇒ detector tests, depolarization studies, cleaning studies
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