

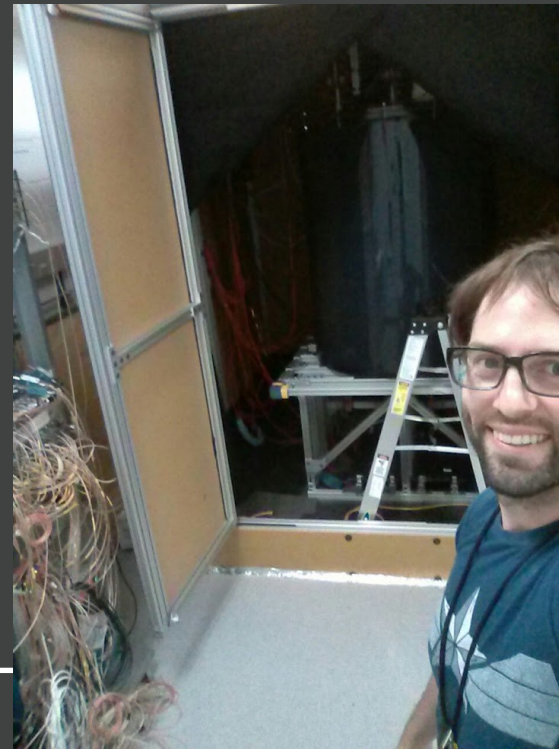
Lindsey Bignell

Direct Detection

ANU node

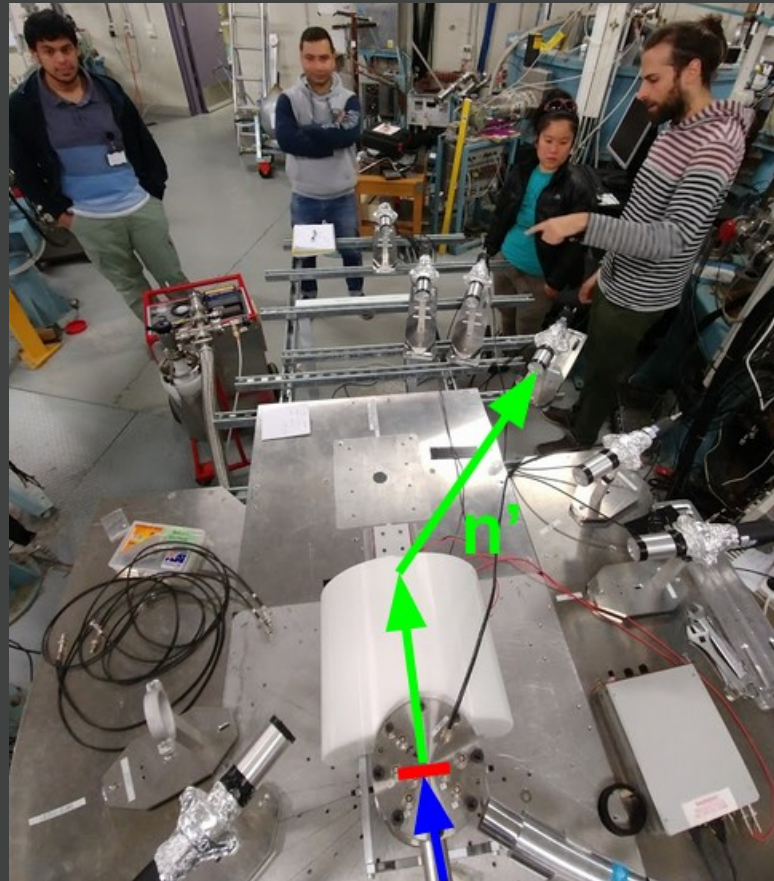
Background

- PhD: University of Sydney (2013)
 - Precision radioactivity measurements.
- Postdoc: Brookhaven National Lab (2013-2016)
 - Experimental neutrino physics
 - Water-based liquid scintillator
 - PROSPECT reactor neutrino experiment
- Diversion: quant @ Macquarie Bank
- ANU 2017-present:
SABRE and CYGNUS



SABRE: quenching factor + particle ID

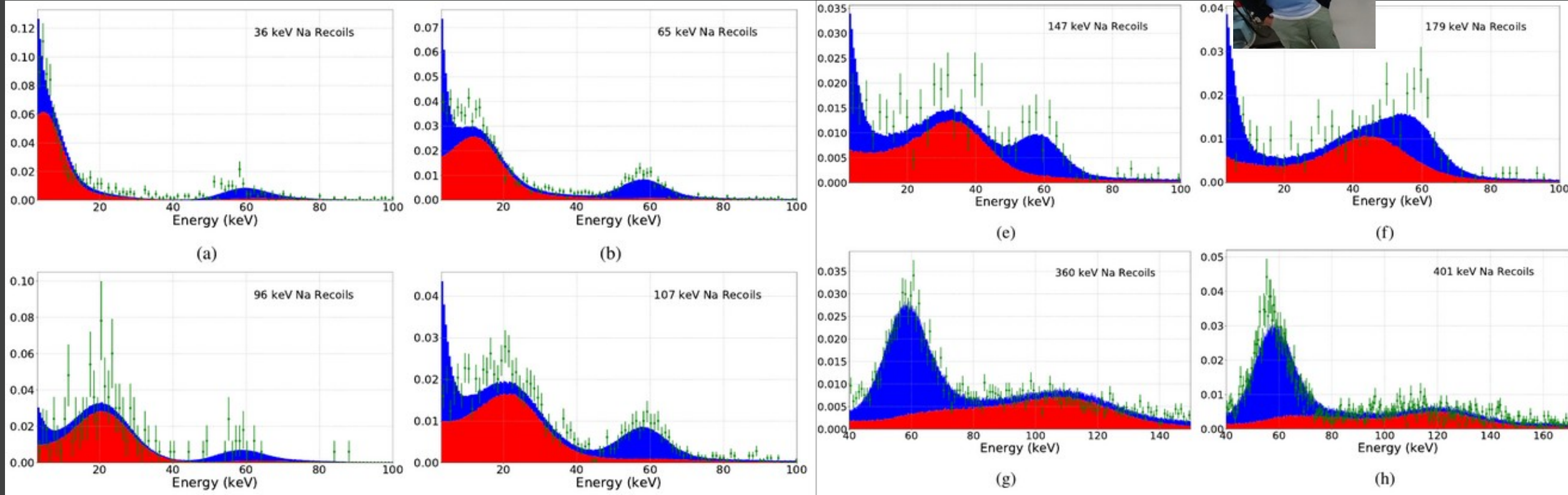
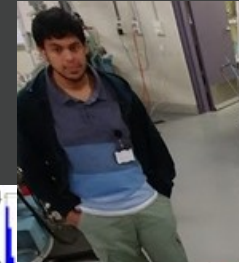
- HIAF → pulsed neutrons.



SABRE: quenching factor + particle ID

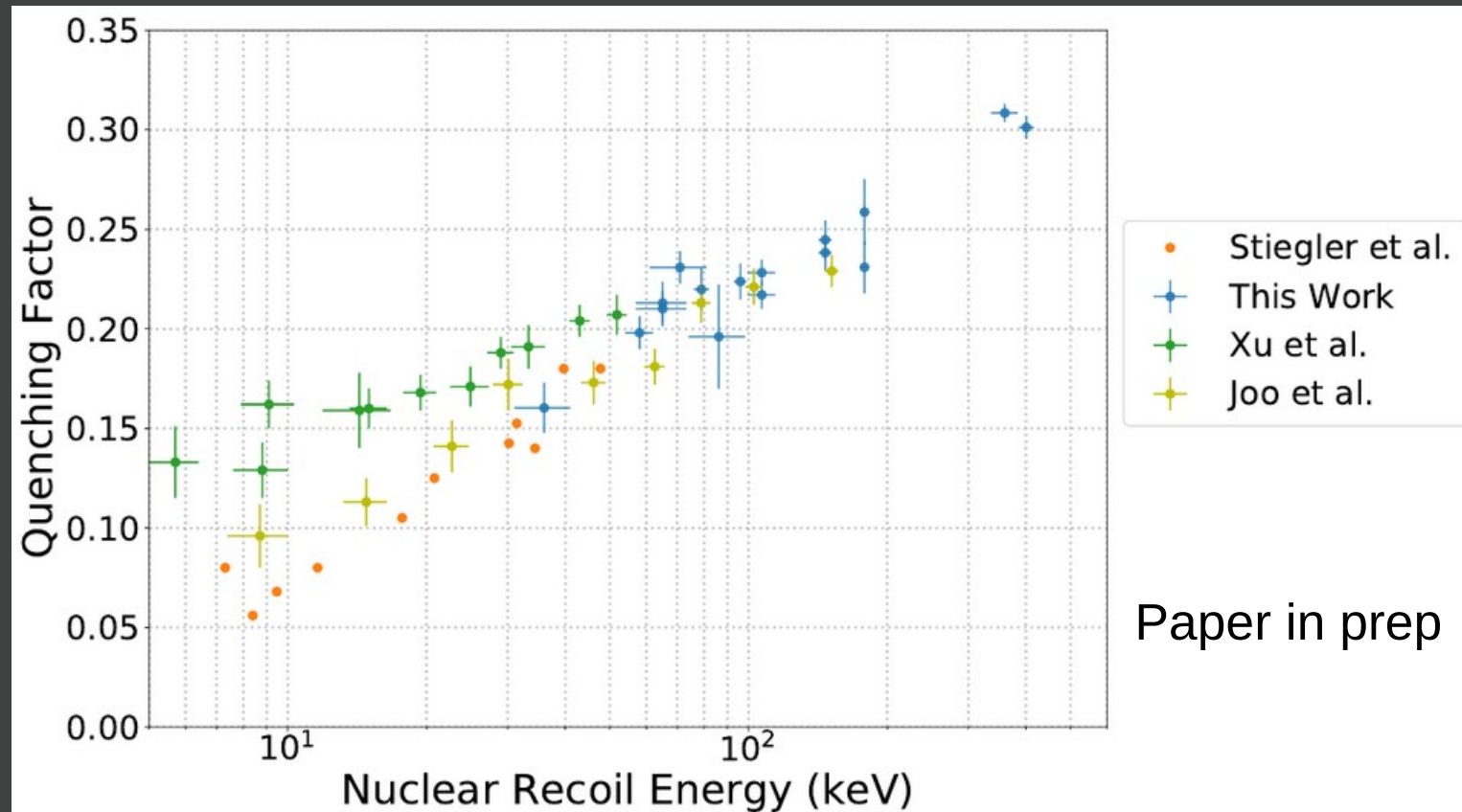
- Nuclear recoil distributions.

Ibtihal Mahmood
(UMelb)



SABRE: quenching factor + particle ID

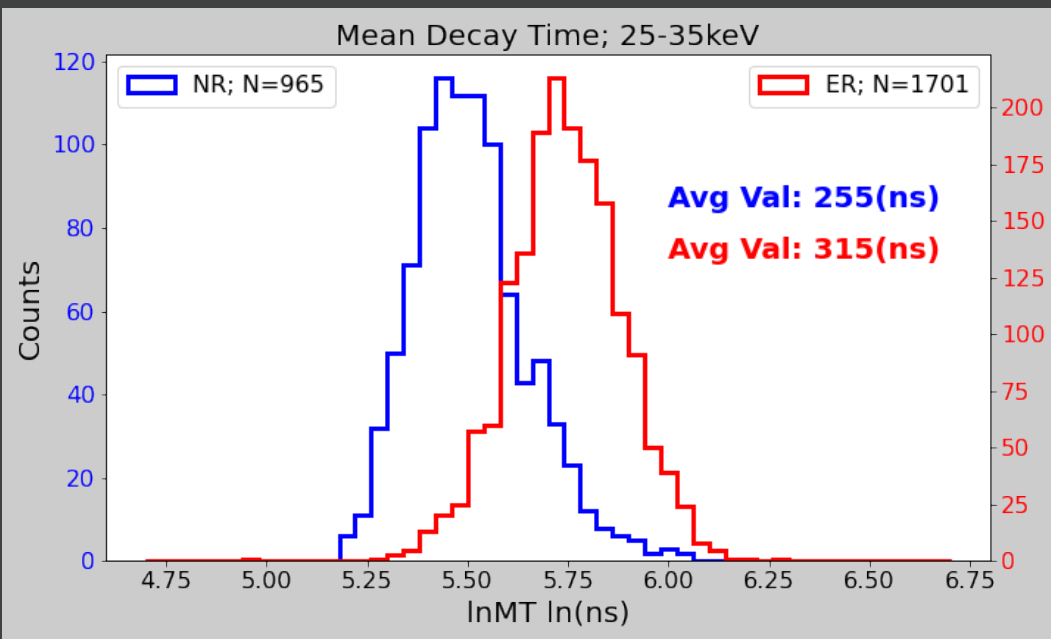
- Quenching factor (sets energy scale for WIMP NR interactions)



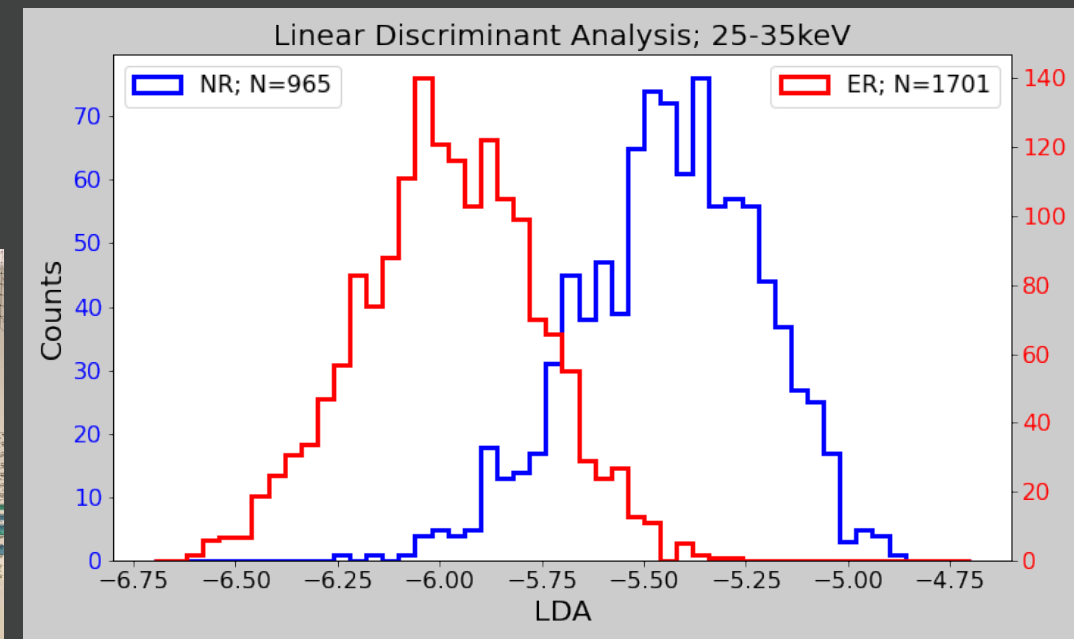
SABRE: quenching factor + particle ID

- Particle ID

Standard Method

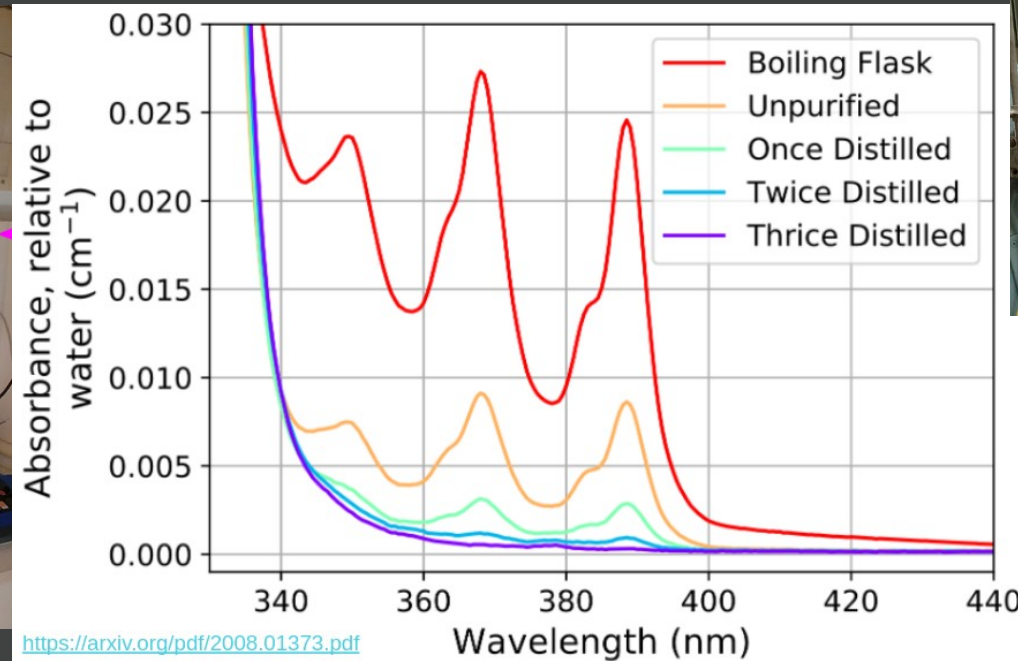


New Method



SABRE: veto liquid scintillator

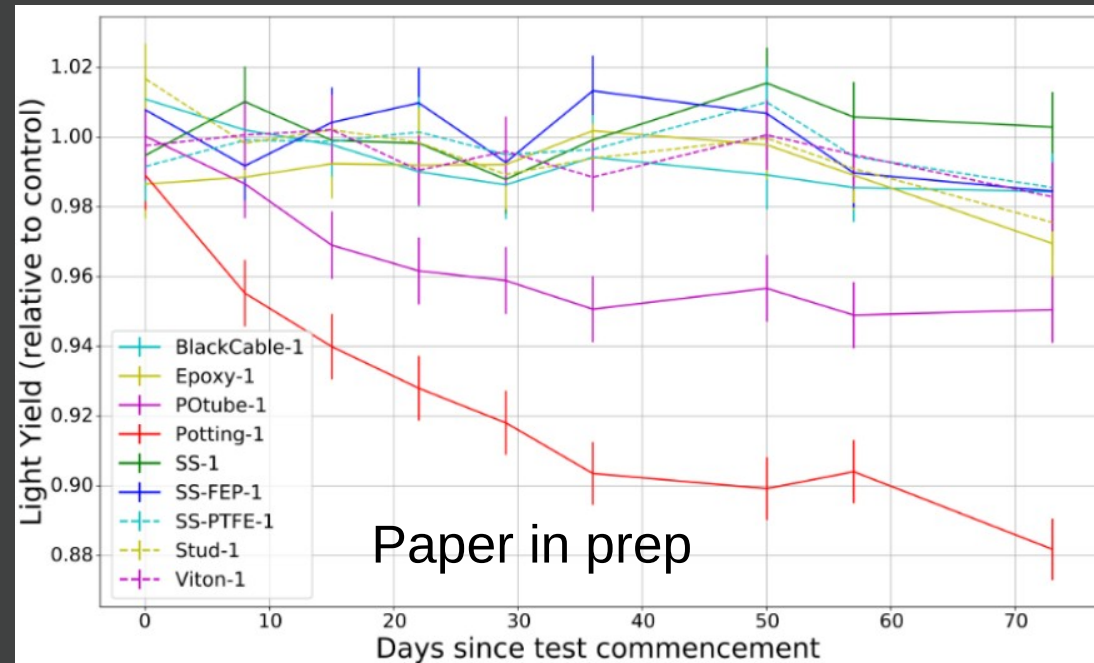
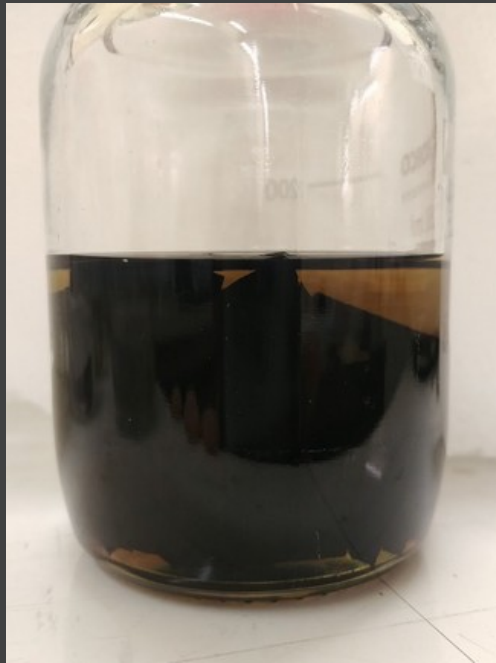
- Characterisation (light yield, attenuation, impurities, etc.)



Jo Wu + various undergrad students

SABRE: veto liquid scintillator

- Characterisation (light yield, attenuation, impurities, etc.)
- Compatibility and scale-up

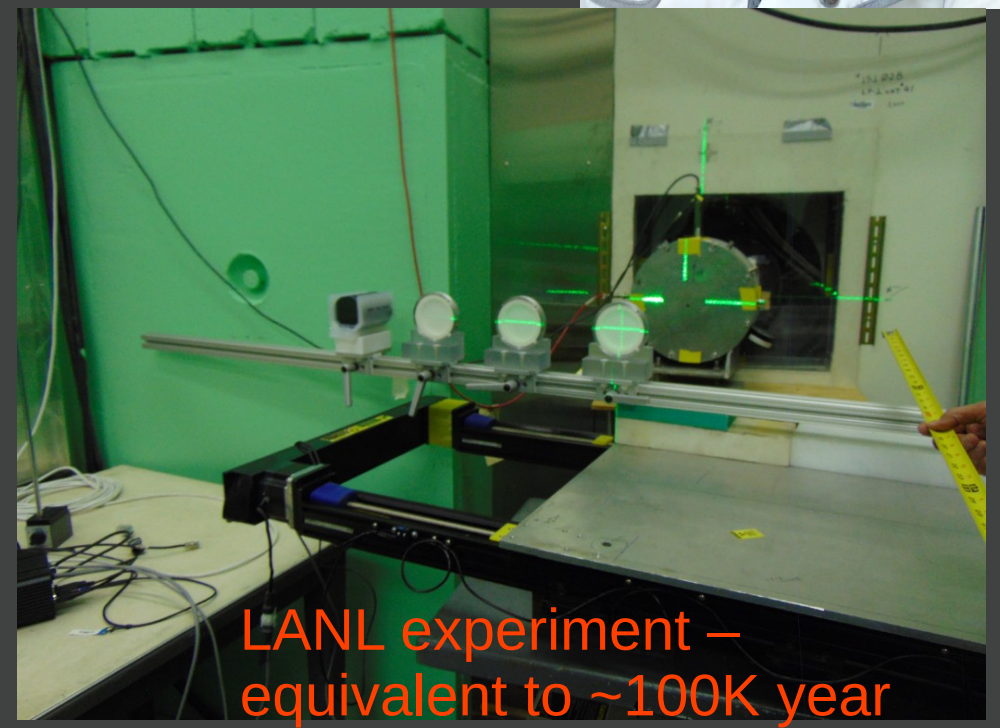
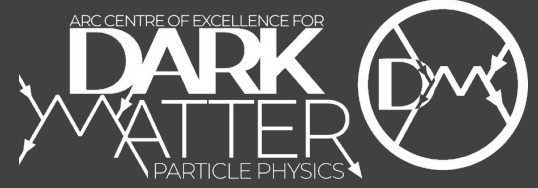
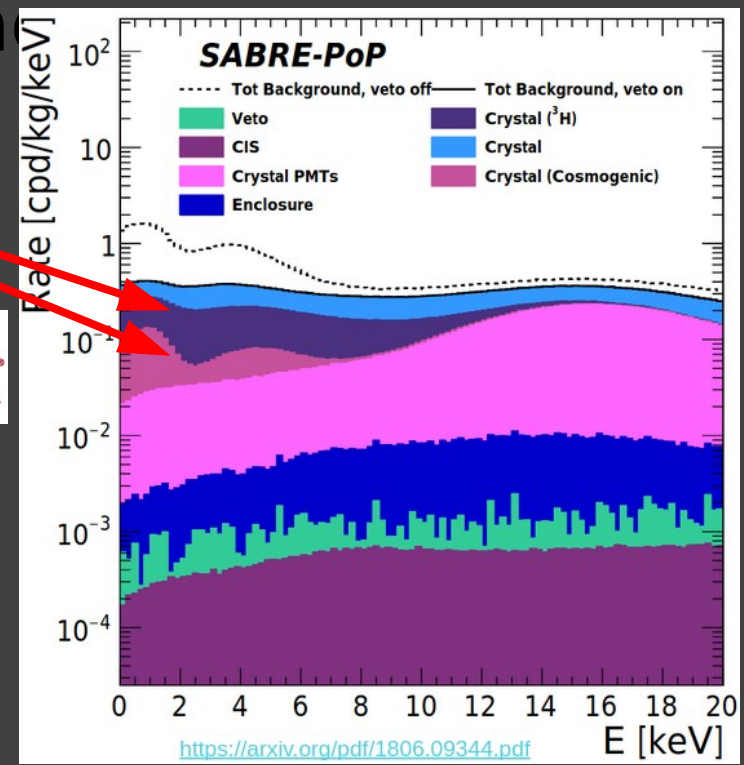


Shahinur Rahman



SABRE: cosmic backgrounds

- Experimental activation cross-sections
- Activation modeling
Cosmic backgrounds



LANL experiment – equivalent to ~100K year above-ground exposure

CYGNUS

- TPC prototype
- CYGNUS-0 (1 cm drift)
 - Recently collected first measurements!
- CYGNUS-1 (17 cm drift)
 - Optical + charge + intensified camera readout
 - GEM gain
 - Negative ions

