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Background Radiation Studies for Future, Above-Ground Antineutrino Detectors

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- ✓ **Underground antineutrino detectors observe power changes and fuel evolution at nuclear power plants**
- ✓ **Compact, non-intrusive monitors provide continuous measurements**
- X **Limited deployment to plants with underground locations**
- ✓ **Above-ground antineutrino detectors can potentially monitor any nuclear power plant**
- X **Less passive shielding due to the loss in overburden**
- X **Significant increase in background due to cosmic and terrestrial radiation sources**

Understanding the above-ground backgrounds will allow for the development of both passive and active shielding for new antineutrino detectors

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NNSA National Nuclear Security Administration

Sandia National Laboratories

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Experimental Measurements

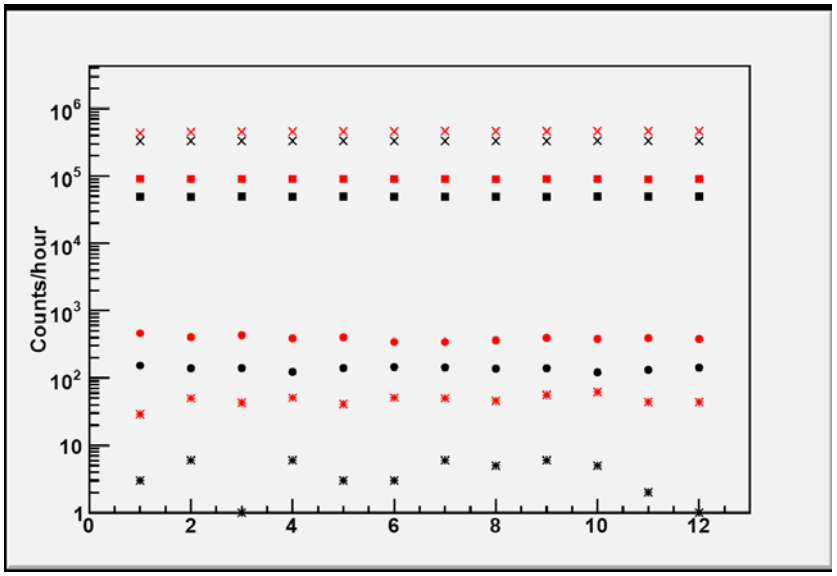
Detector Suite

NaI-Gammas

Liquid Scintillator
Good PSD

Muon Paddle
Correlated times

^{3}He-Thermal neutrons



Comparison of detector rates at:
6 mwe at UC
2nd story at UC

- x Gamma rates
- ▪ Muons
- • Fast neutrons
- * Thermal neutrons

Deployment-

01/08 Above-ground Sandia, California
02/08 6 meters water equivalent (m.w.e.), University of Chicago
03/08 2nd floor above-ground, UC
Summer 08 Above-ground at a nuclear power plant (planned)

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