

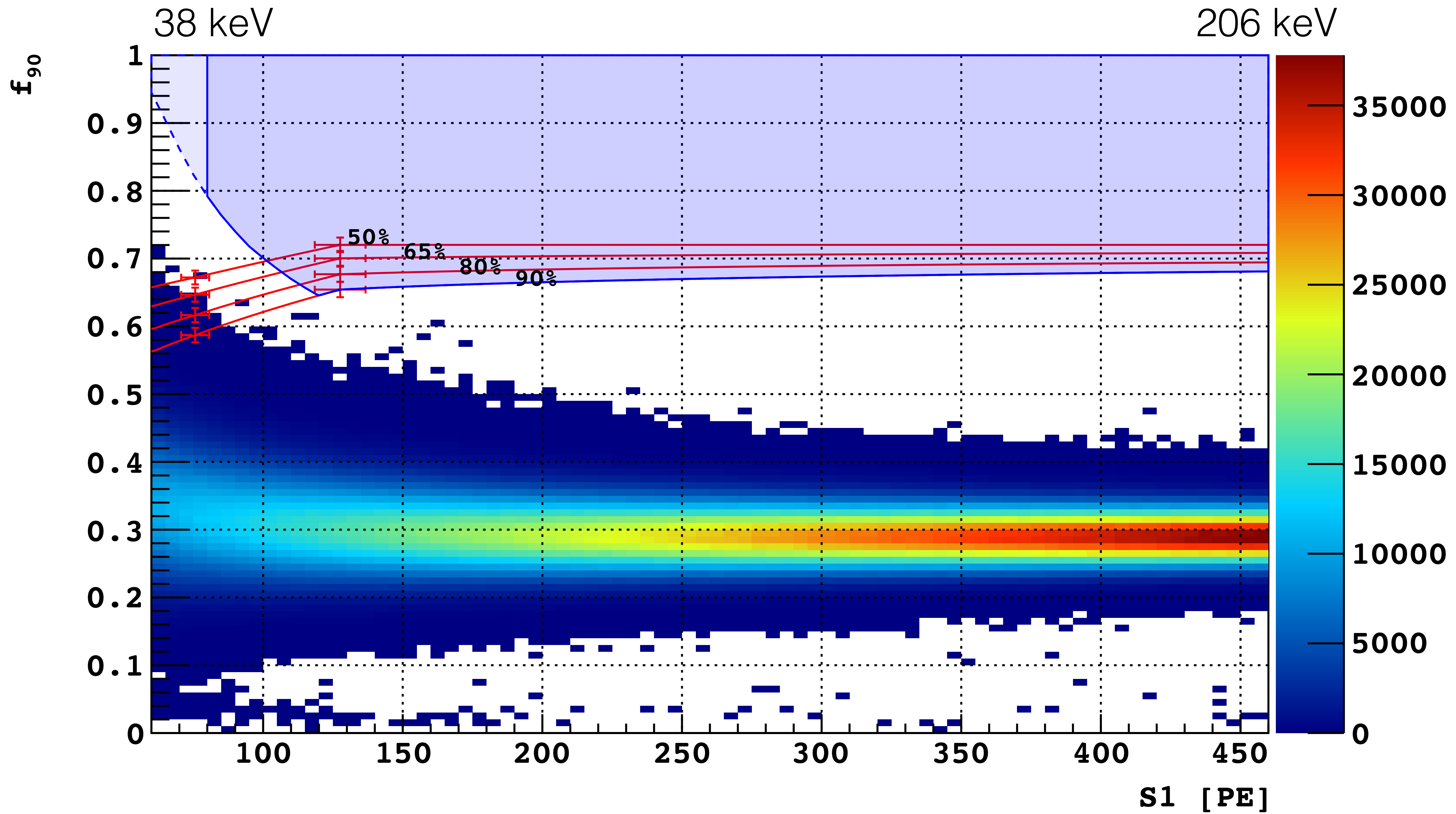
DarkSide-50

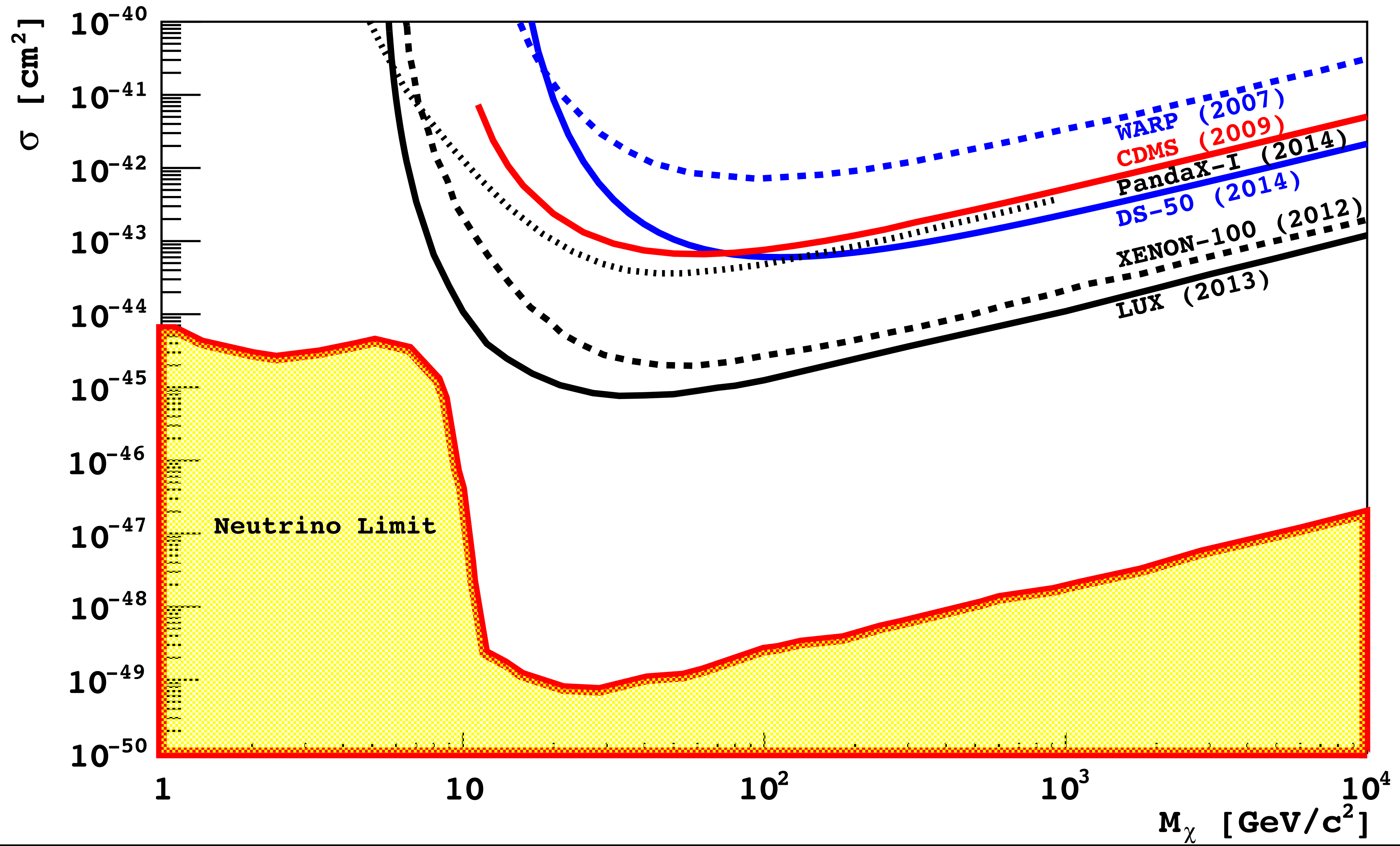
Cristiano Galbiati

Princeton University

XLII LNGS Scientific Committee Meeting

November 13, 2014



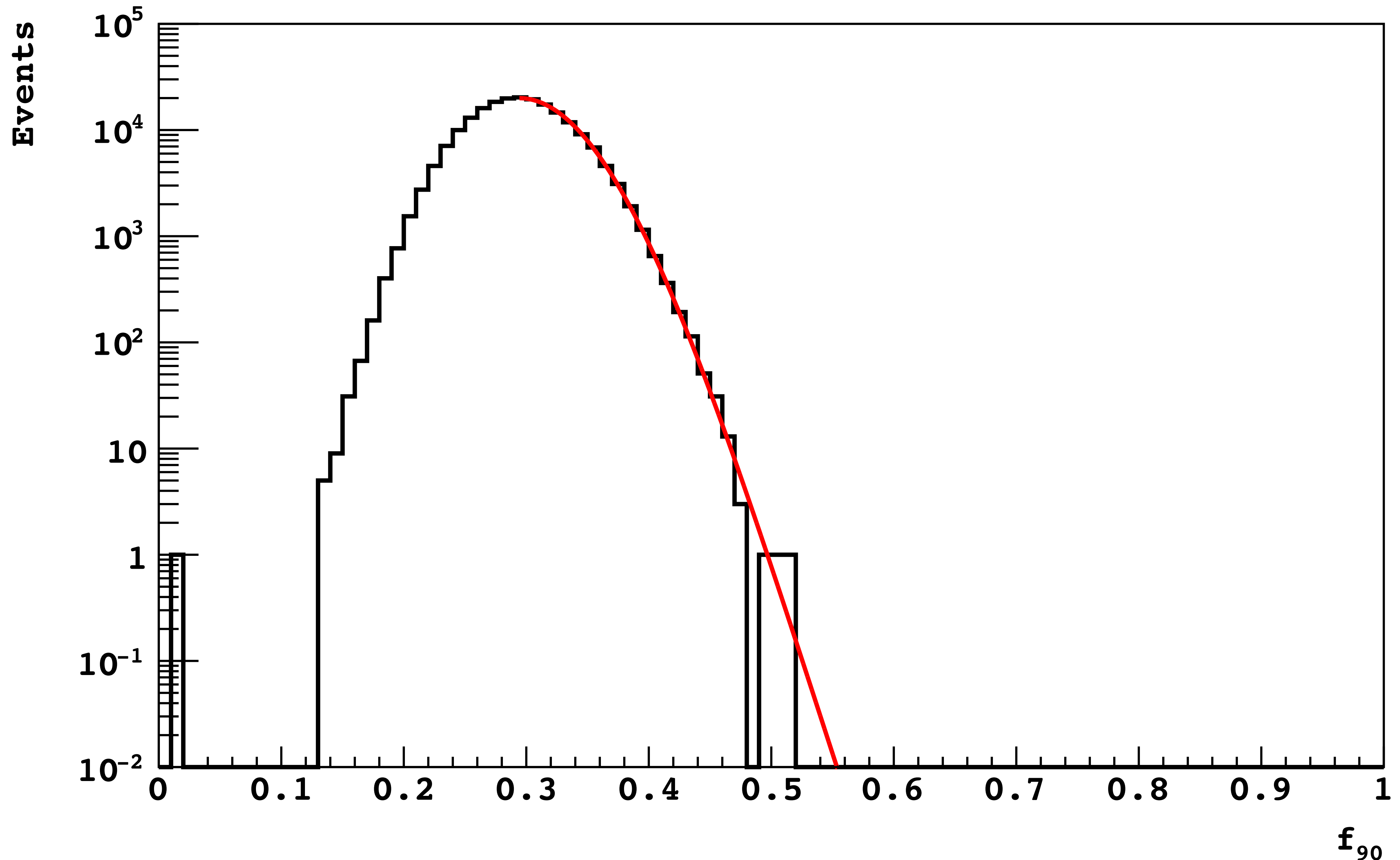


Detector Parameters

- LY: 8 p.e./keV_{ee}
- Drift field: 200 V/cm
- HV stability: >1 yr, no excursions
- Electron lifetime: $\gg 5$ ms
- Temperature/pressure stability: ± 0.1 mbar over 1,080 mbar in ullage

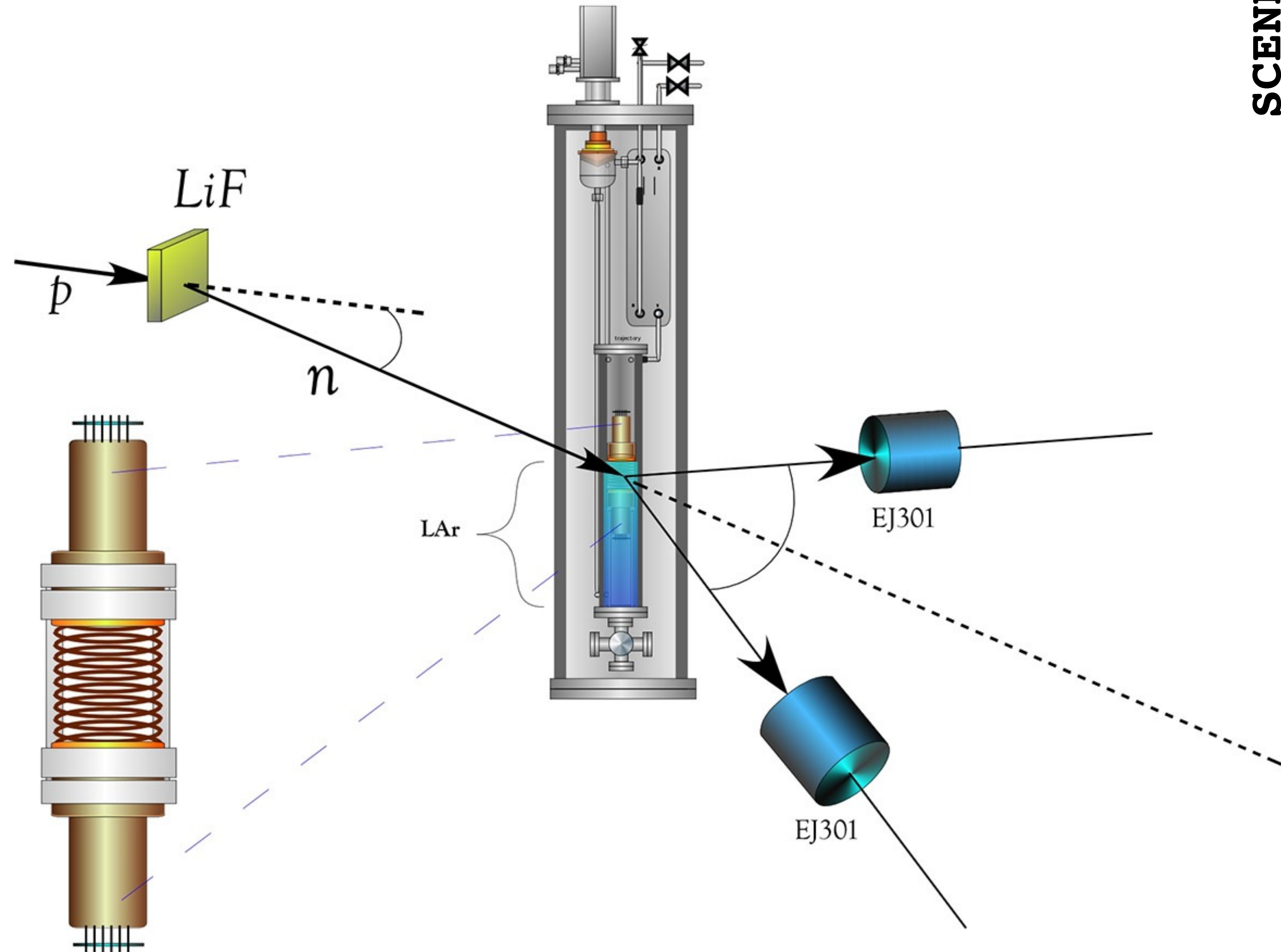
Significance

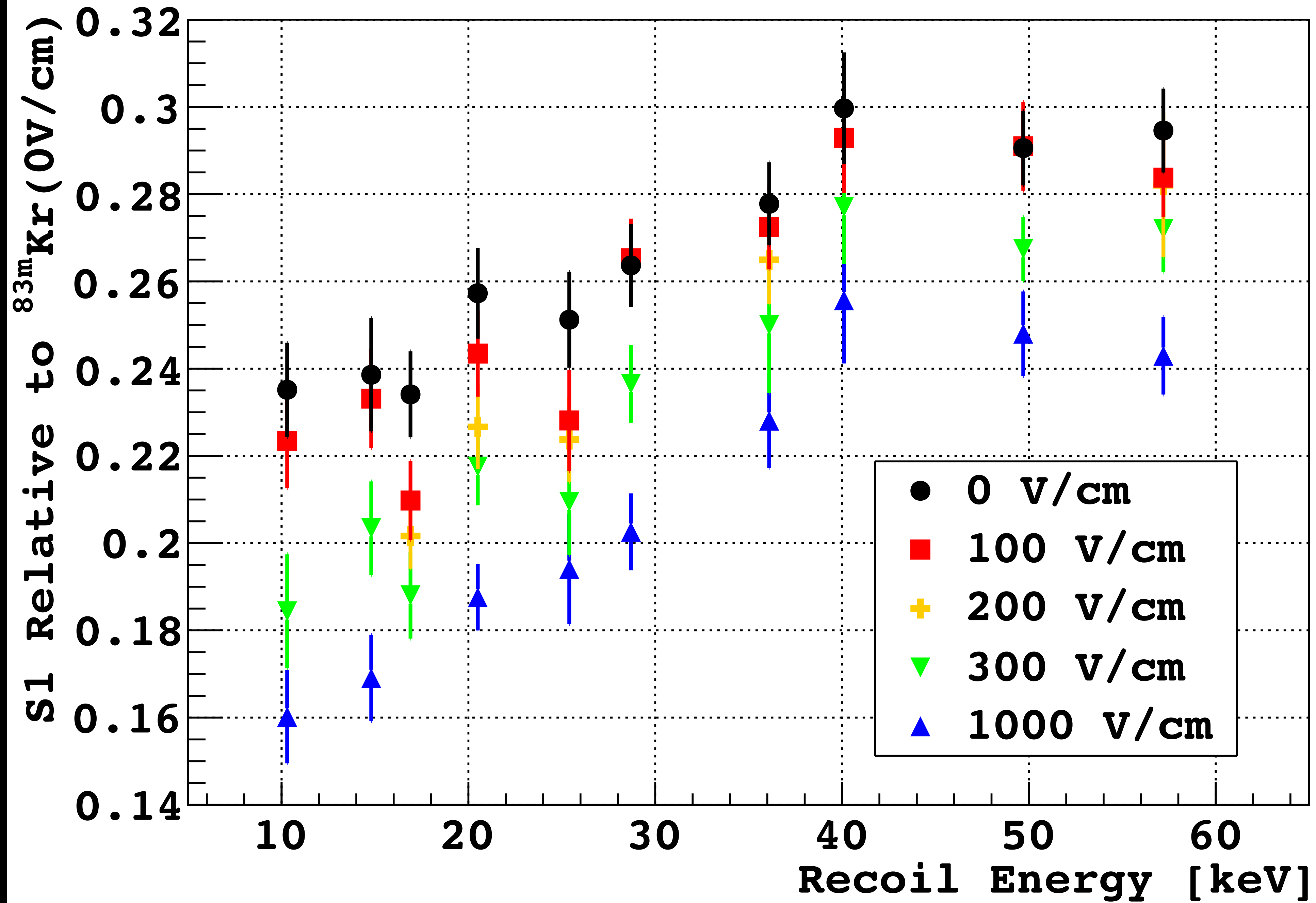
- Background free fiducial exposure of 1,422 kg×d of atmospheric argon
- Equivalent to 215,000 kg×d (0.6 tonne×yr) exposure of underground argon
 - Equivalent to 20 years run of DarkSide-50 with underground argon
- Measured rejection of β/γ background in dark matter signal region is 7×10^{-8}
- Distribution of ^{39}Ar background in PSD parameter compatible with statistical expectation originating from binomial distribution over singlet/triple states
- Unique capability of two-phase LAr TPC for background-free ultimate search for dark matter

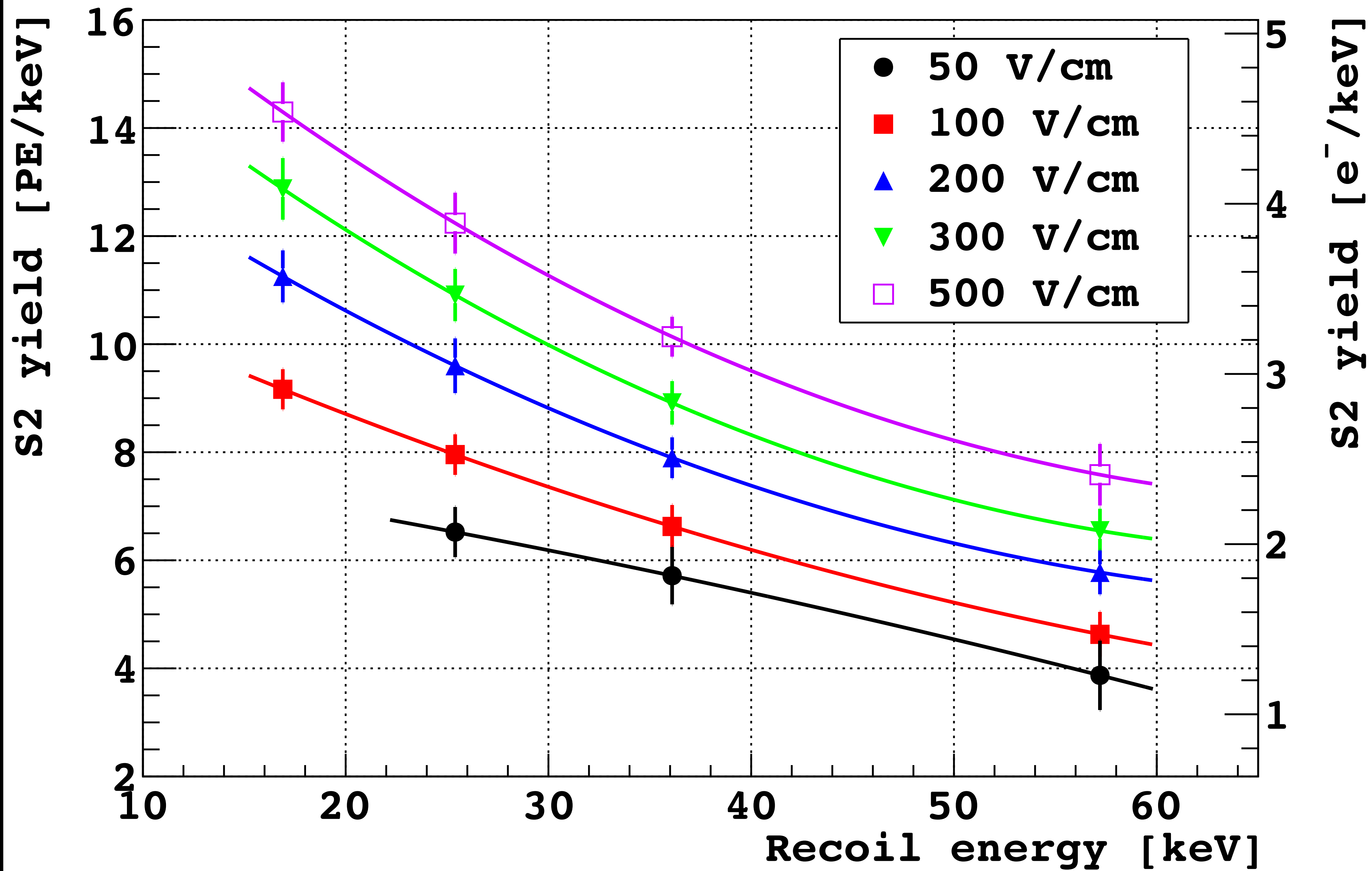


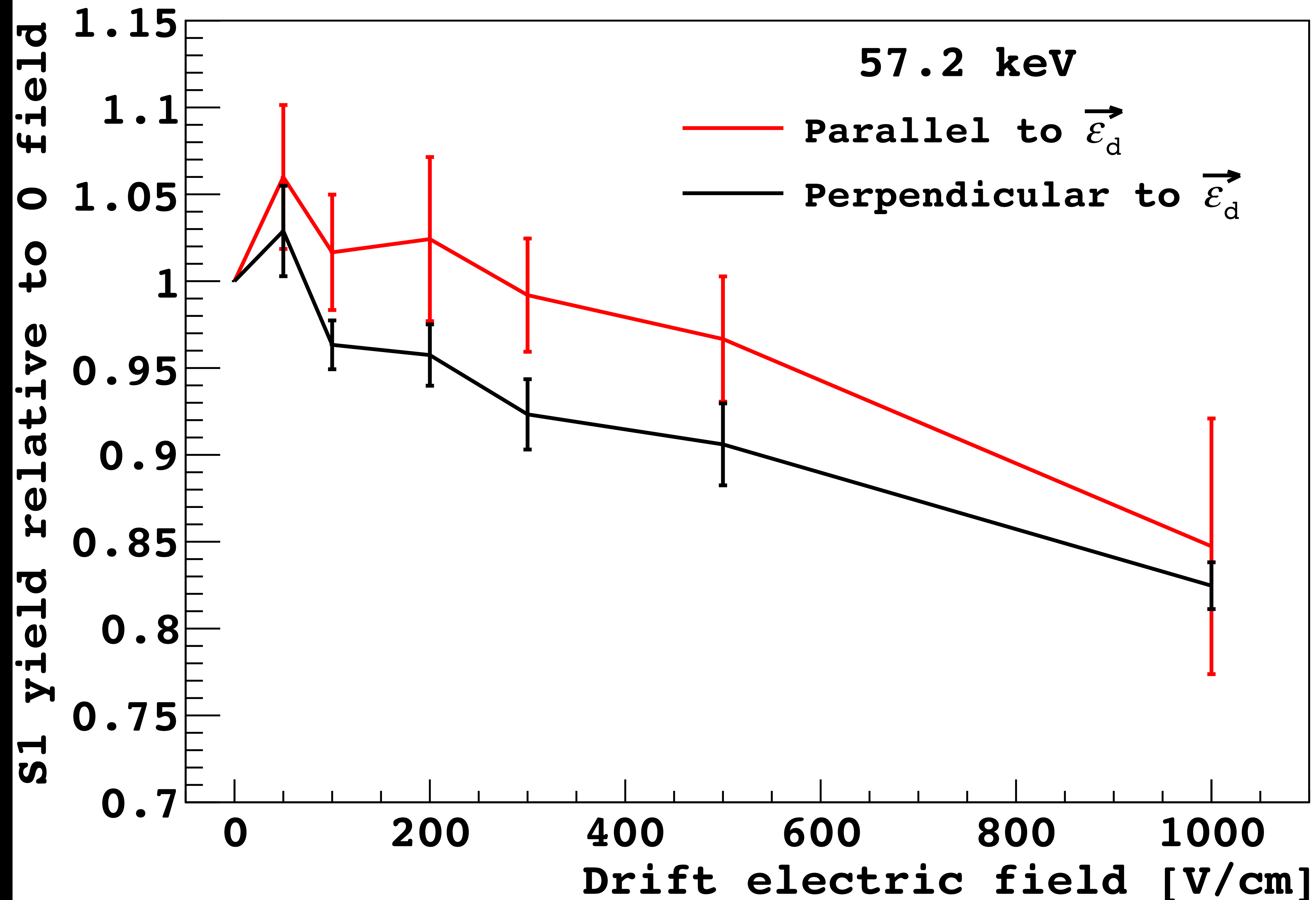
${}^7\text{Li}(p,n)$ on thin LiF target to generate low energy, pulsed, monochromatic neutron beam

Triple coincidence between pulse proton beam, LAr TPC, liquid scintillator detectors for detection of scattered neutrons

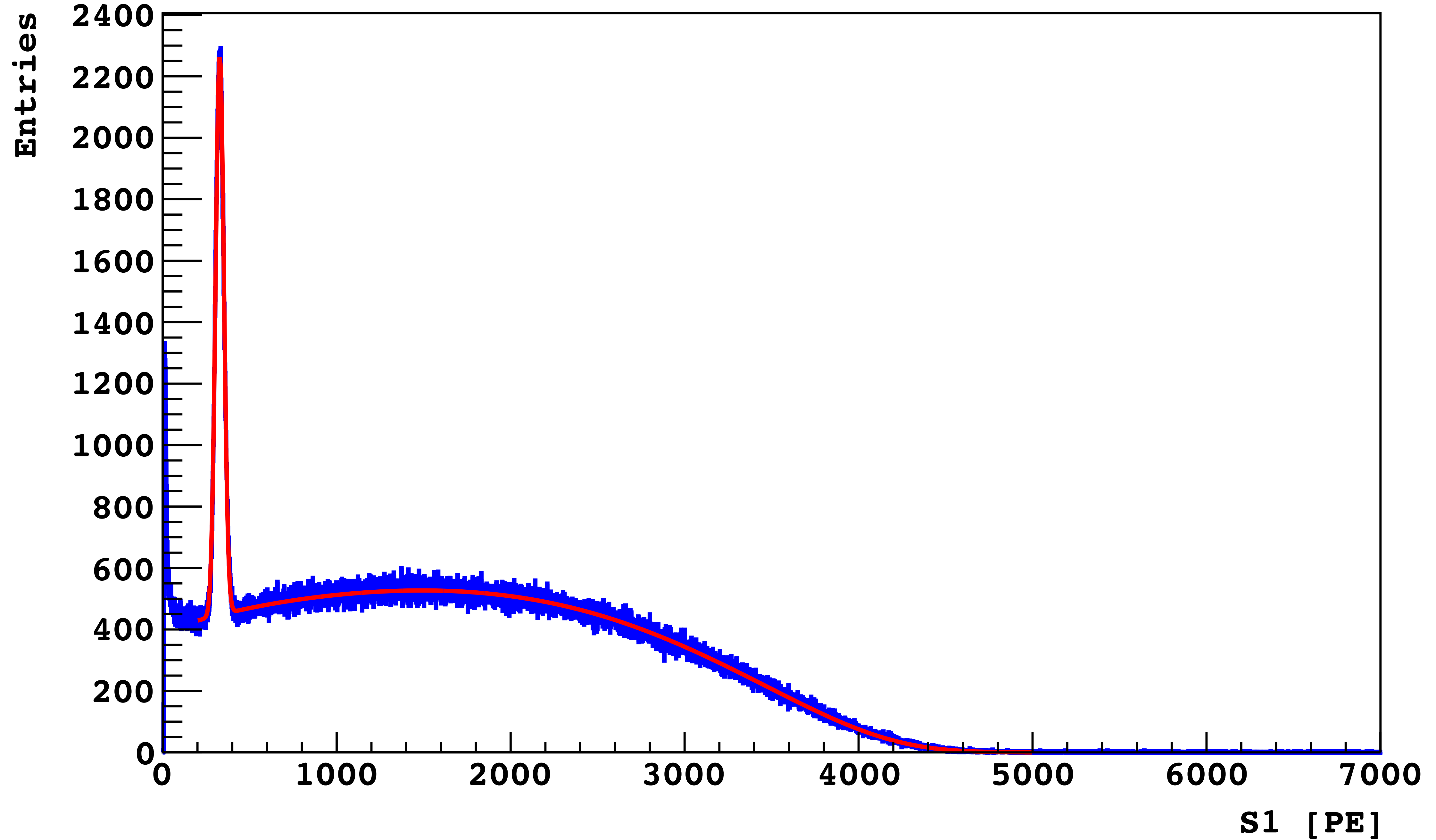






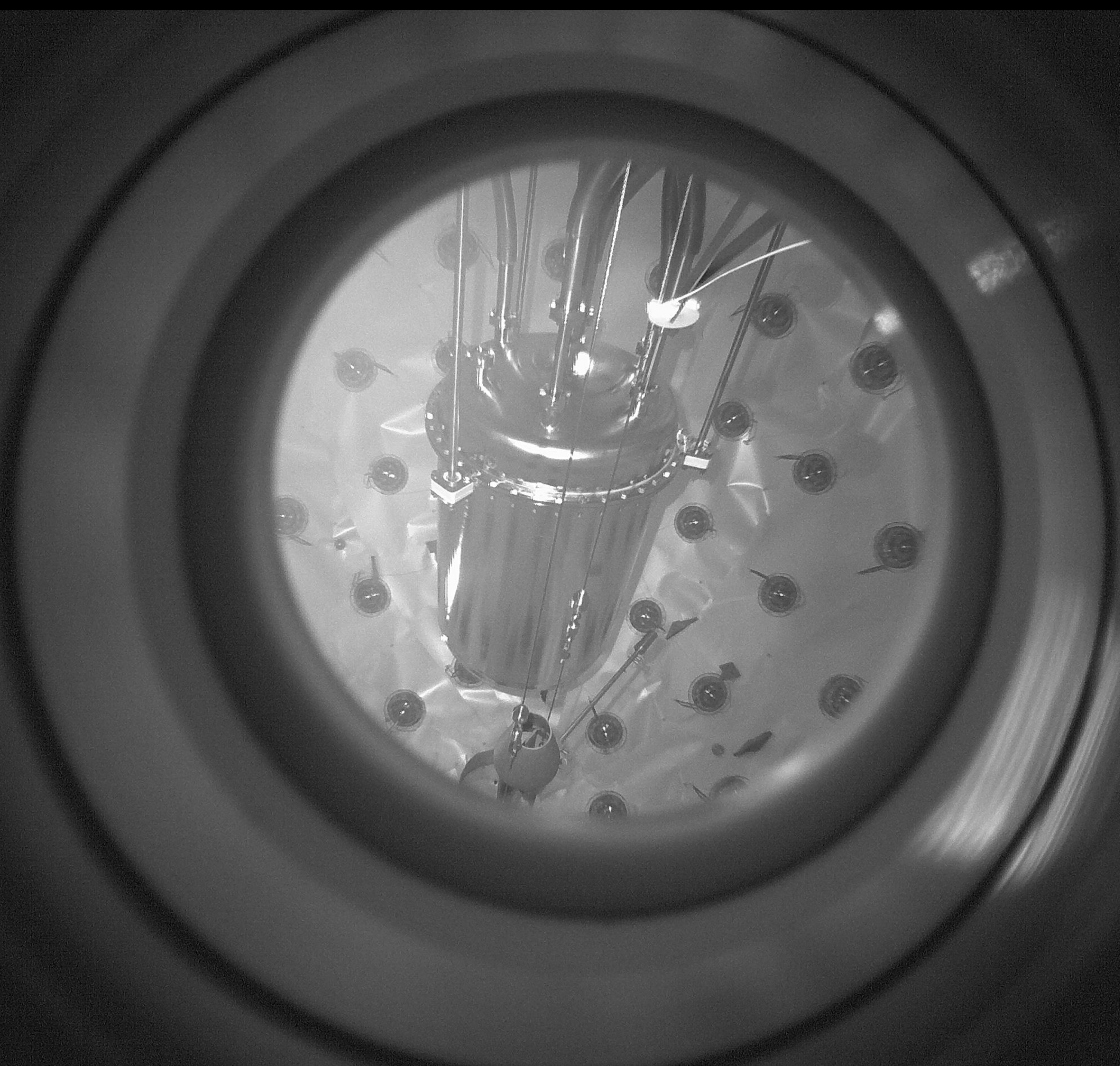


39 keV



Plans

- In-situ calibration campaign with gamma and neutron sources under way
- Fill TPC with underground argon at early 2015
Begin dark matter search with underground argon
- Planning for future DarkSide detectors at LNGS



Significance

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The End