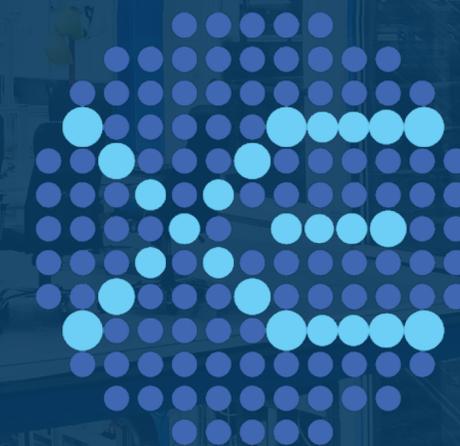




Search for New Physics in Electronic Recoil Data from XENONnT

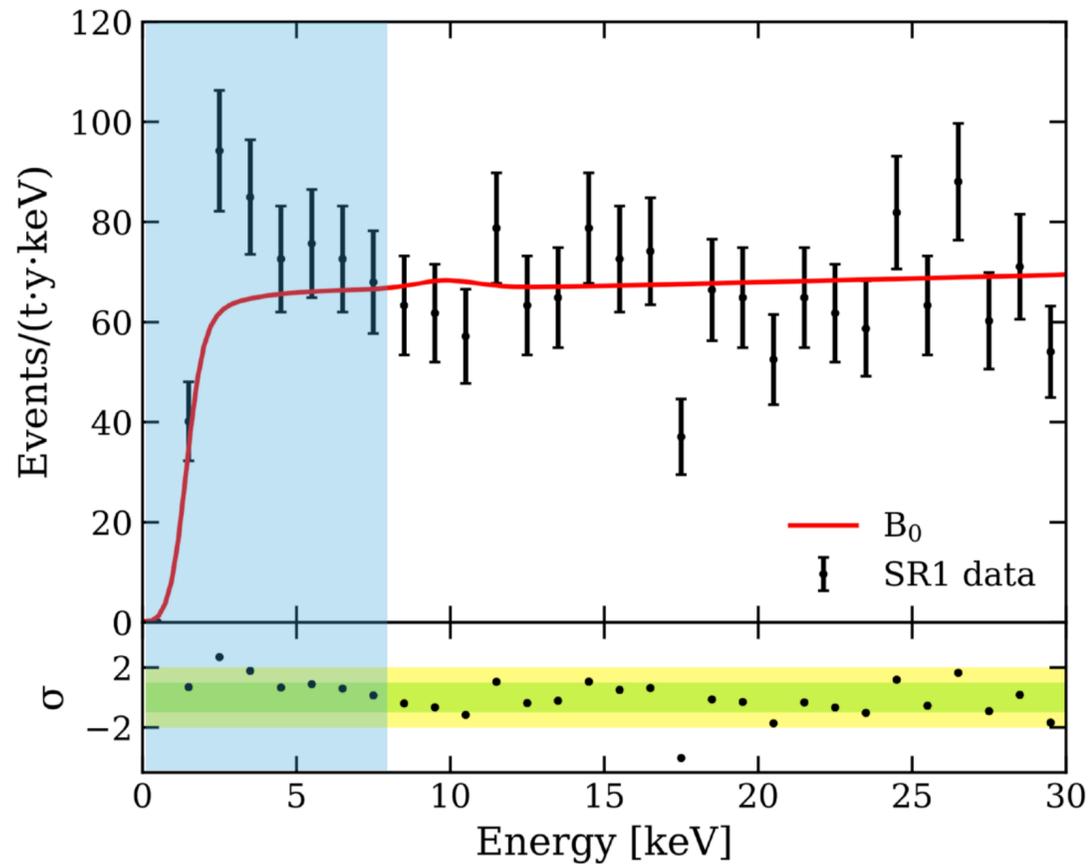
Shingo Kazama (Nagoya, KMI)



XENON

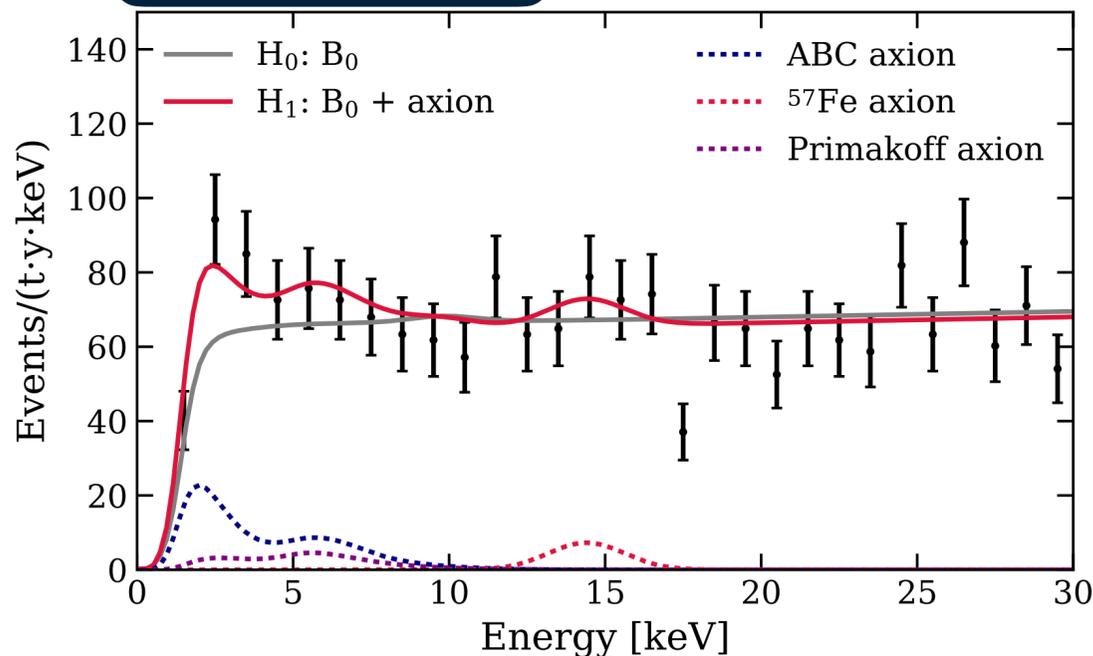
@"What is dark matter? - Comprehensive study of the huge discovery space in dark matter"

Low-Energy Electronic Recoil Excess

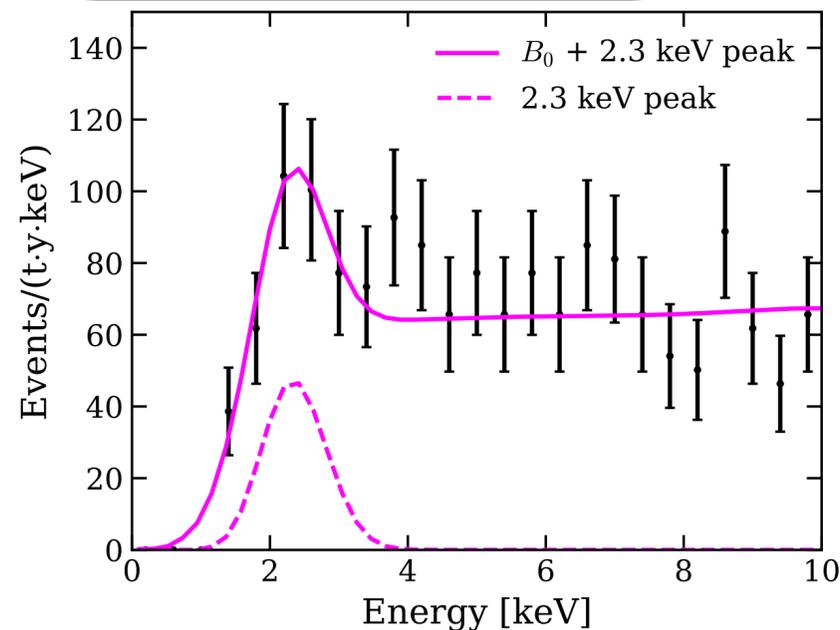


- XENON1T observed an excess near 2 keV (3.3σ)
- Excess compatible with solar axions, ALPs, dark photons, neutrino magnetic moment and many more
- However, it is also consistent with tritium (HT, HTO)
- Investigate this excess with the initial XENONnT data

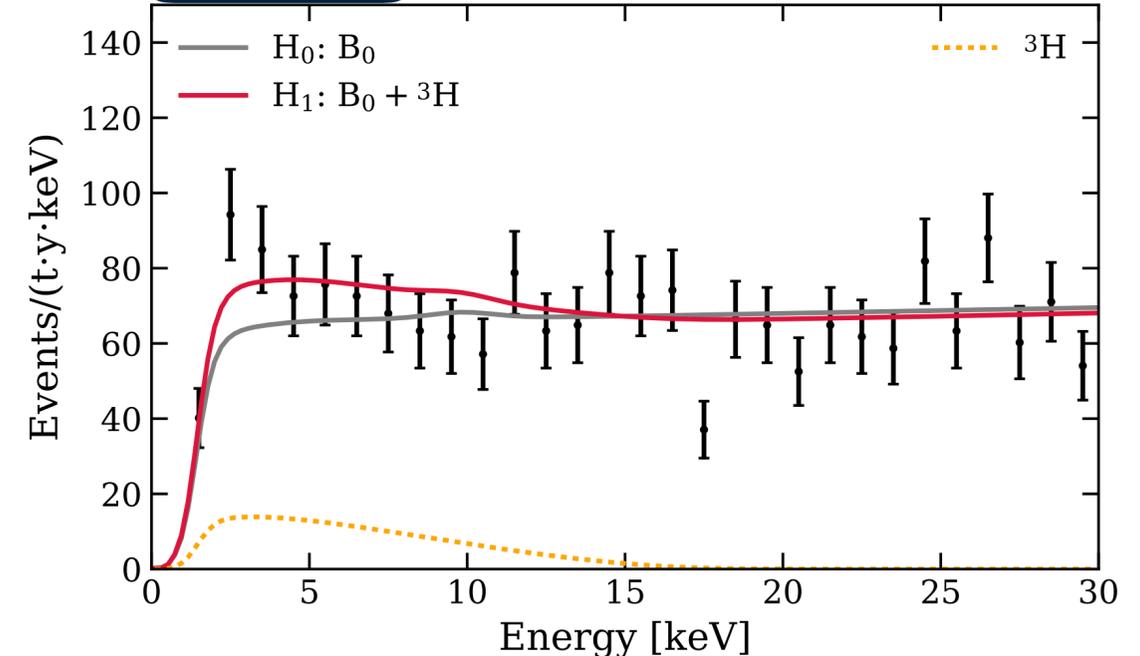
Solar-Axion



ALP/Dark Photon



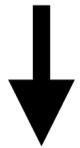
Tritium



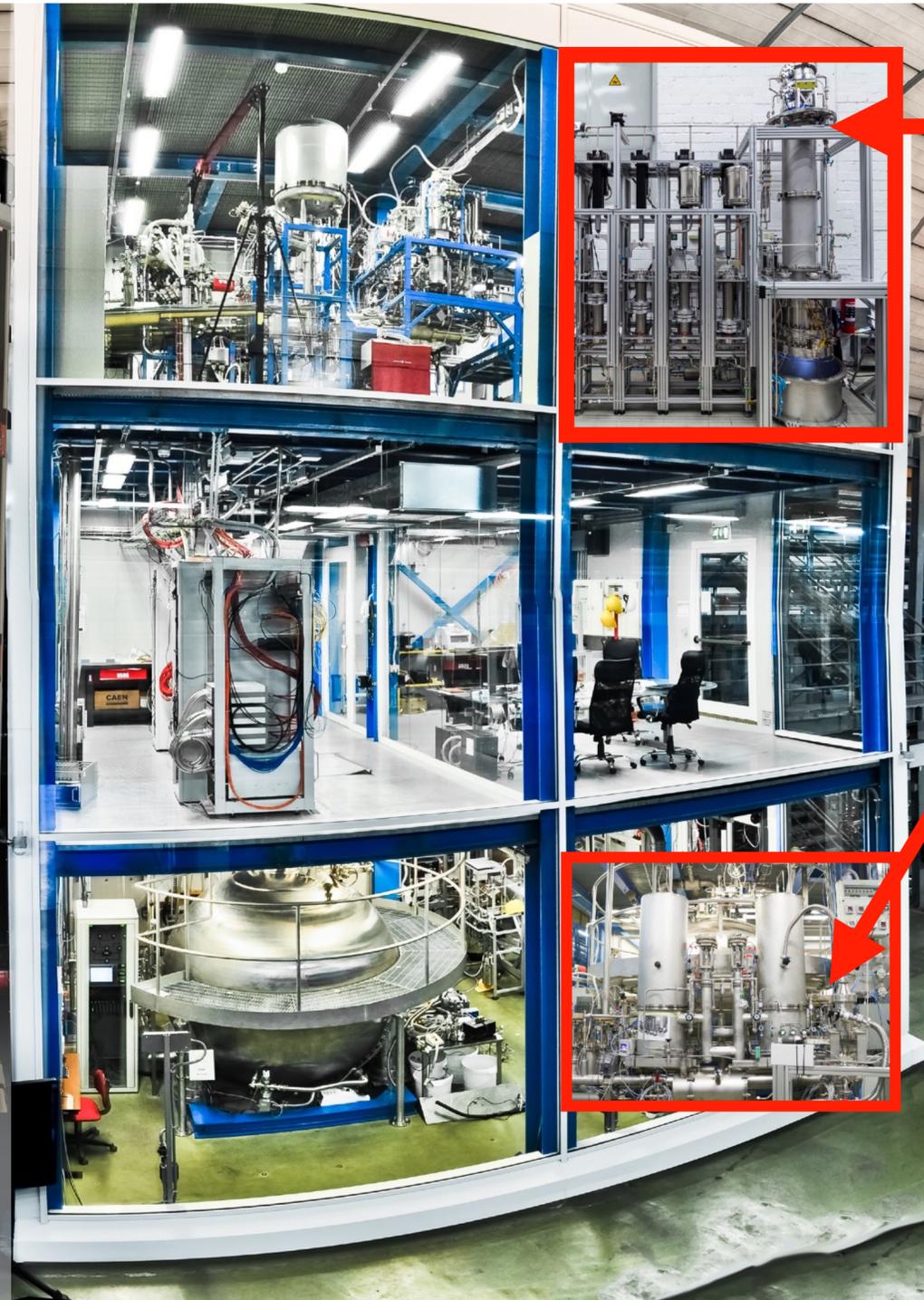
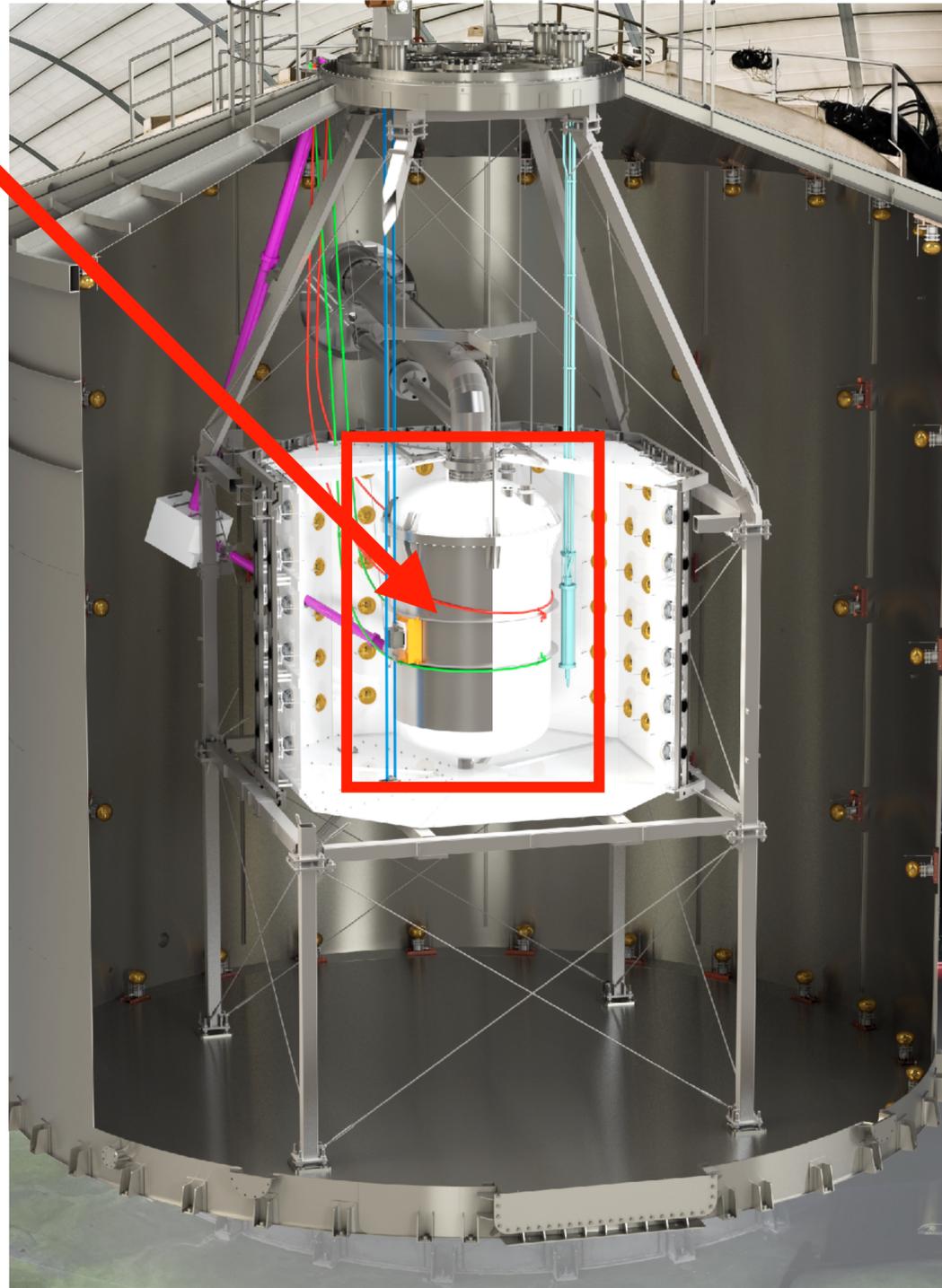
The XENONnT Detector

Larger TPC

97.1 days × 4.4 ton FV
= 1.2 ton-year



~2 times larger statistics w.r.t. 1T

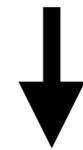


Rn Distillation

~8 times less ^{214}Pb BG w.r.t. 1T

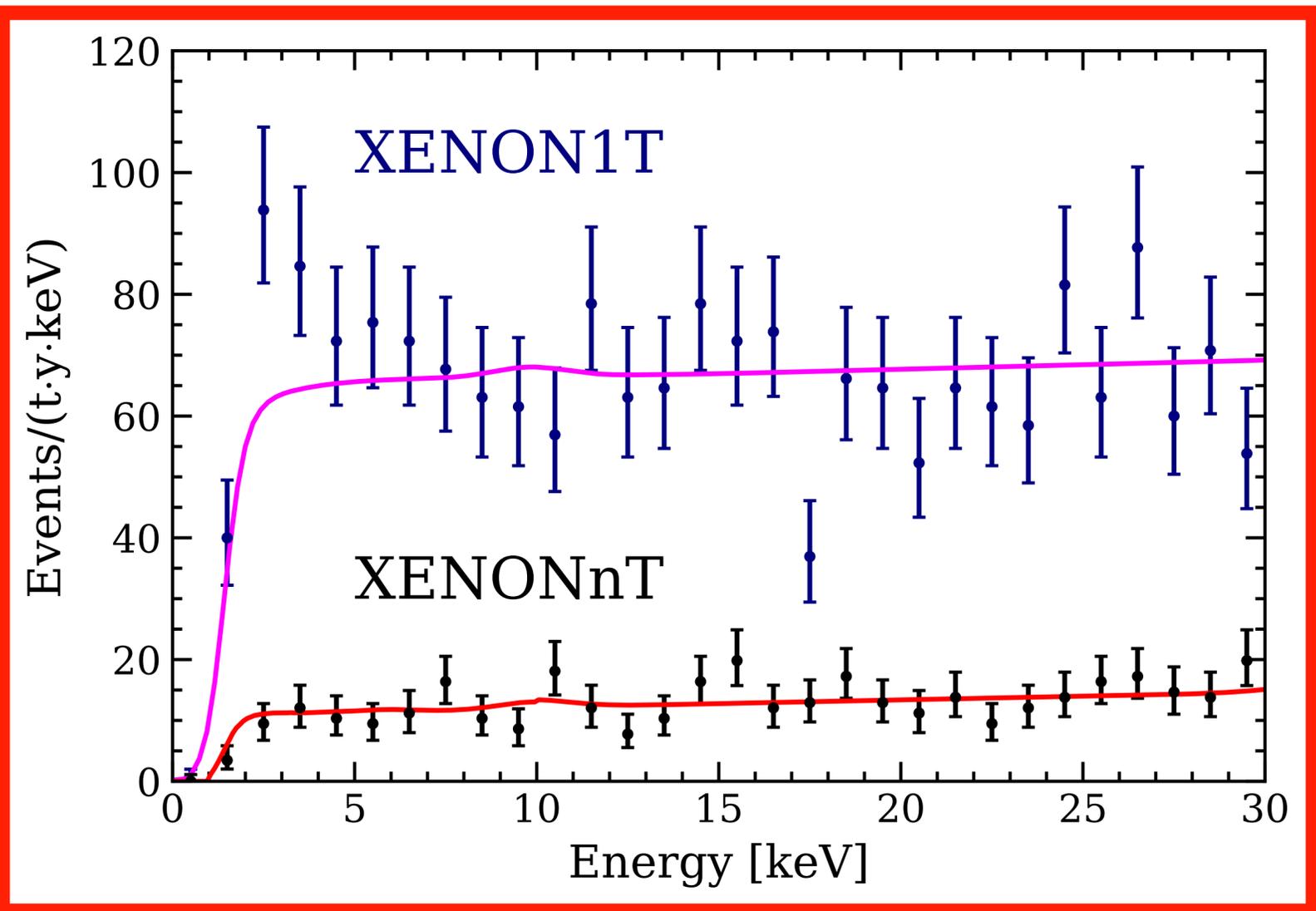
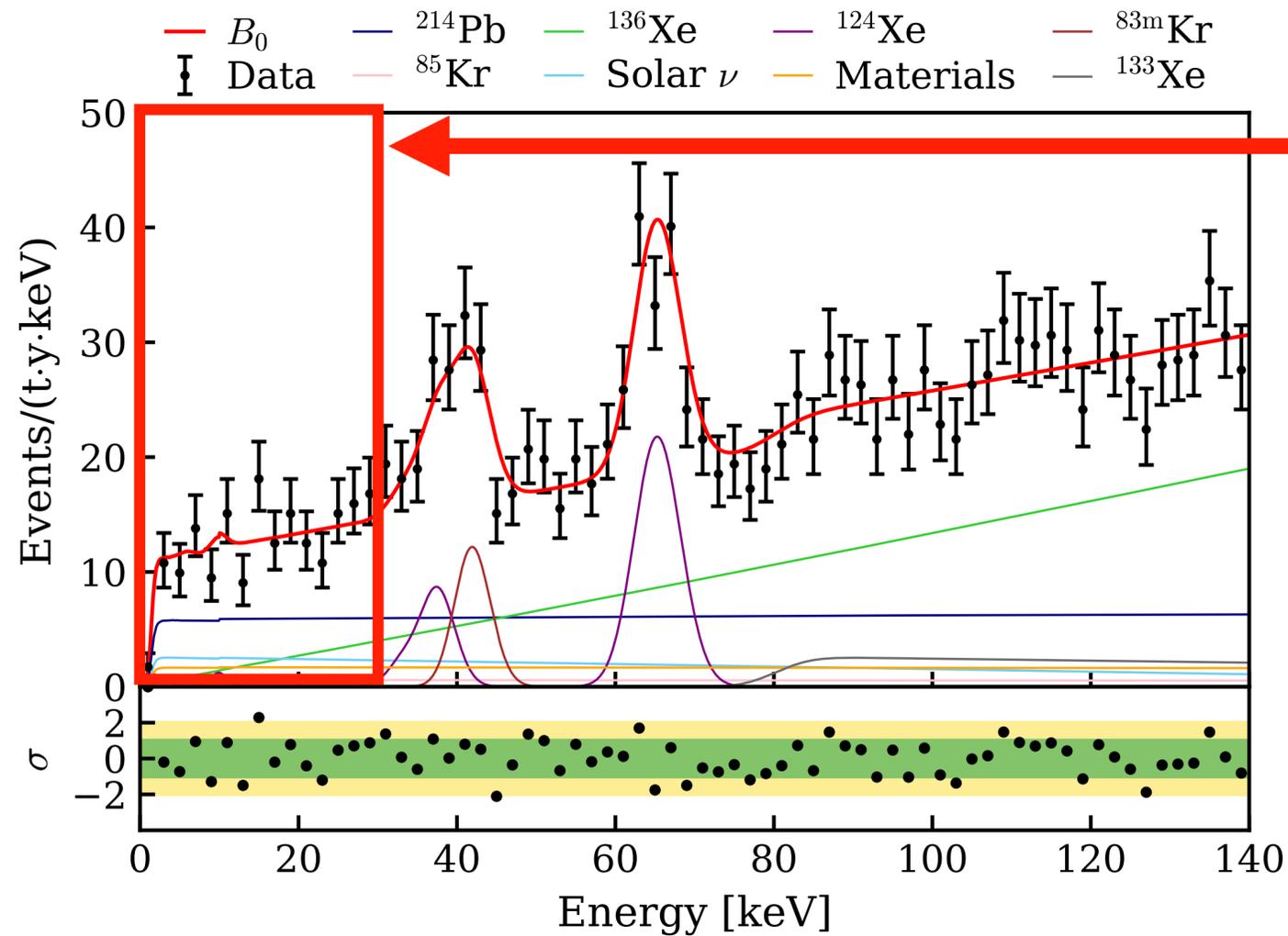
LXe Purification

Better LXe purity
ex: O_2 : ~0.02 ppb
(~1 ppb in 1T)



Less Tritium

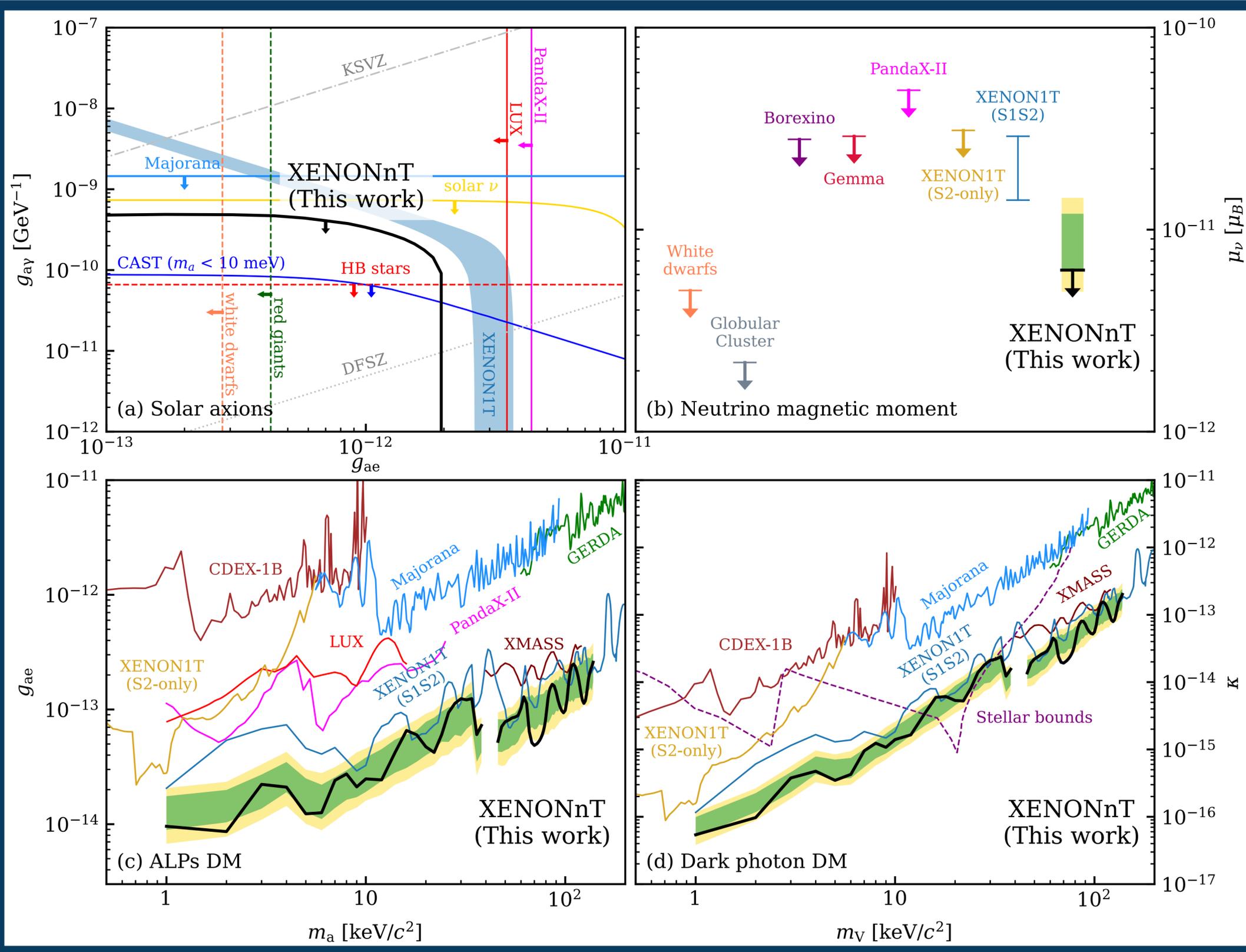
Electronic Recoil Spectrum @ XENONnT



- Data agree with BG-only model in the whole energy range
- No excess is found in the low energy region!
- Most likely the explanation of XENON1T excess is a small tritium contamination. XENONnT, taking steps to reduce tritium outgassing, sees no excess

Constraints on BSM Physics

Solar-Axion



Neutrino
Magnetic
Moment

ALPs

Dark Photon