

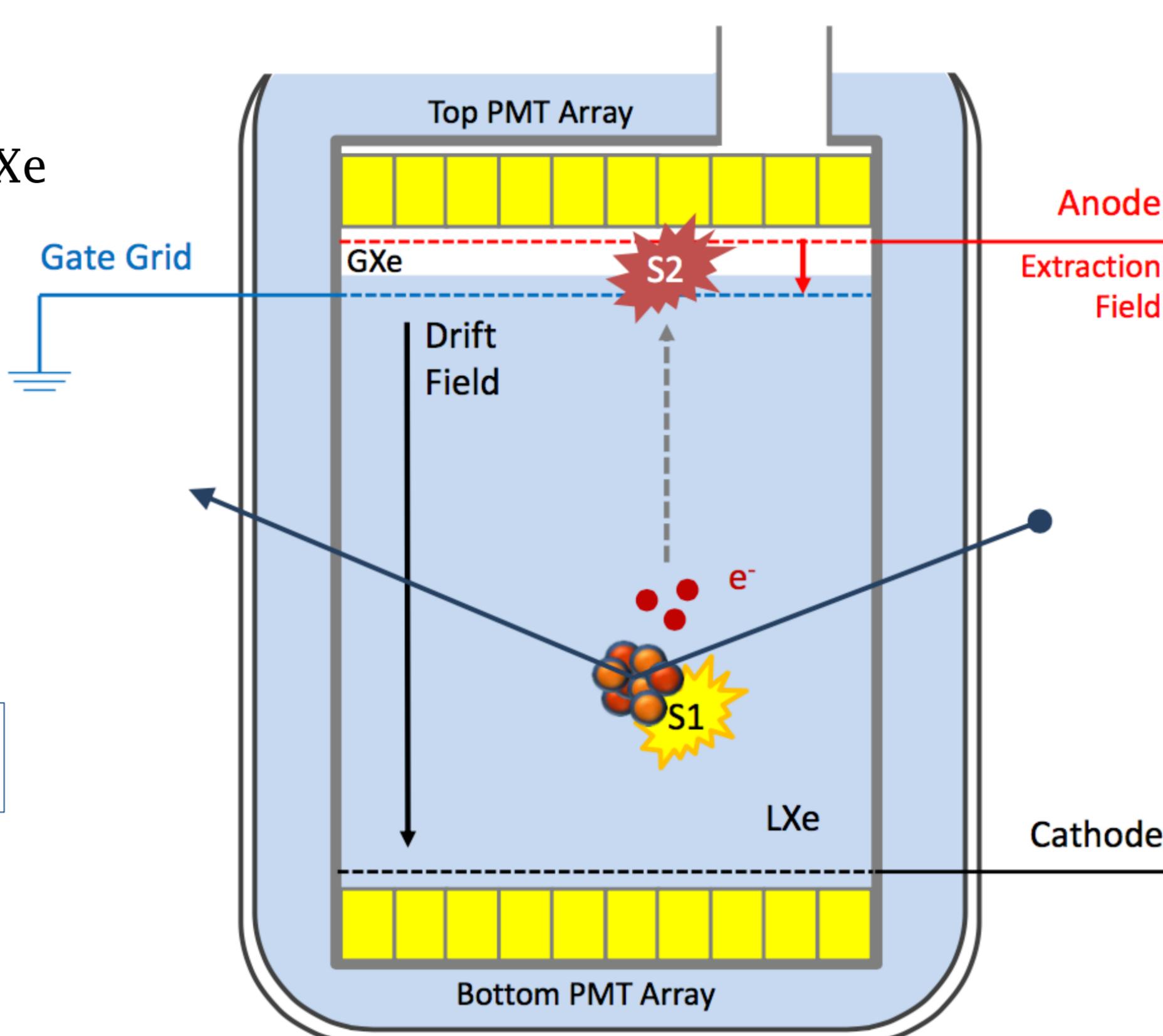
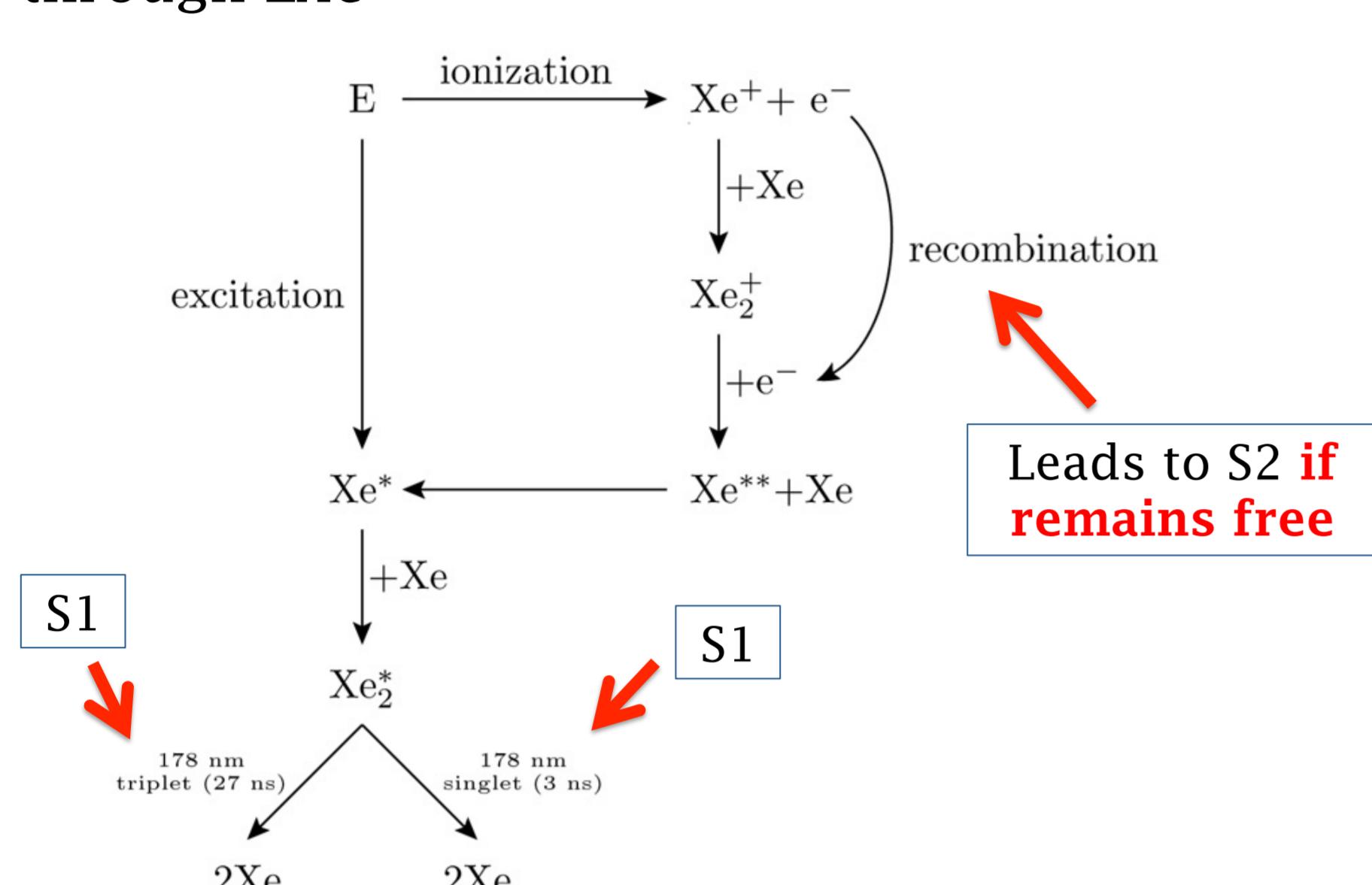
Measurement of the Light and Charge Yield of Low Energy Electronic and Nuclear Recoils in Liquid Xenon for Different Electric Fields



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Dual-Phase LXe TPC

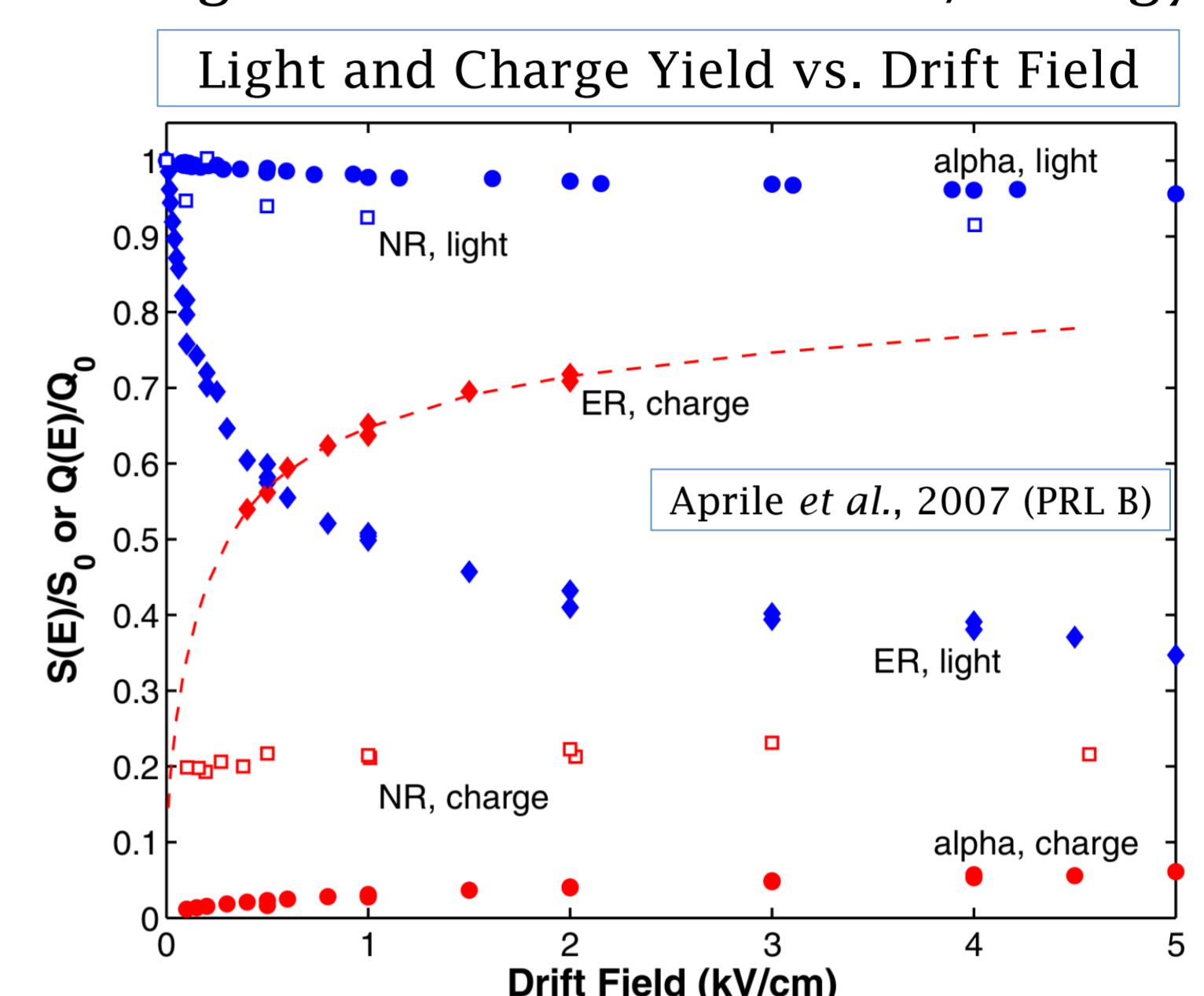
- Simultaneous detection of light and charge
- S1:** Prompt light emission from interaction in LXe
- S2:** Complementary signal from acceleration of electrons through GXe after electrons drift through LXe



Light and Charge Yield

- Light and charge yield **non-linear** in energy and drift field

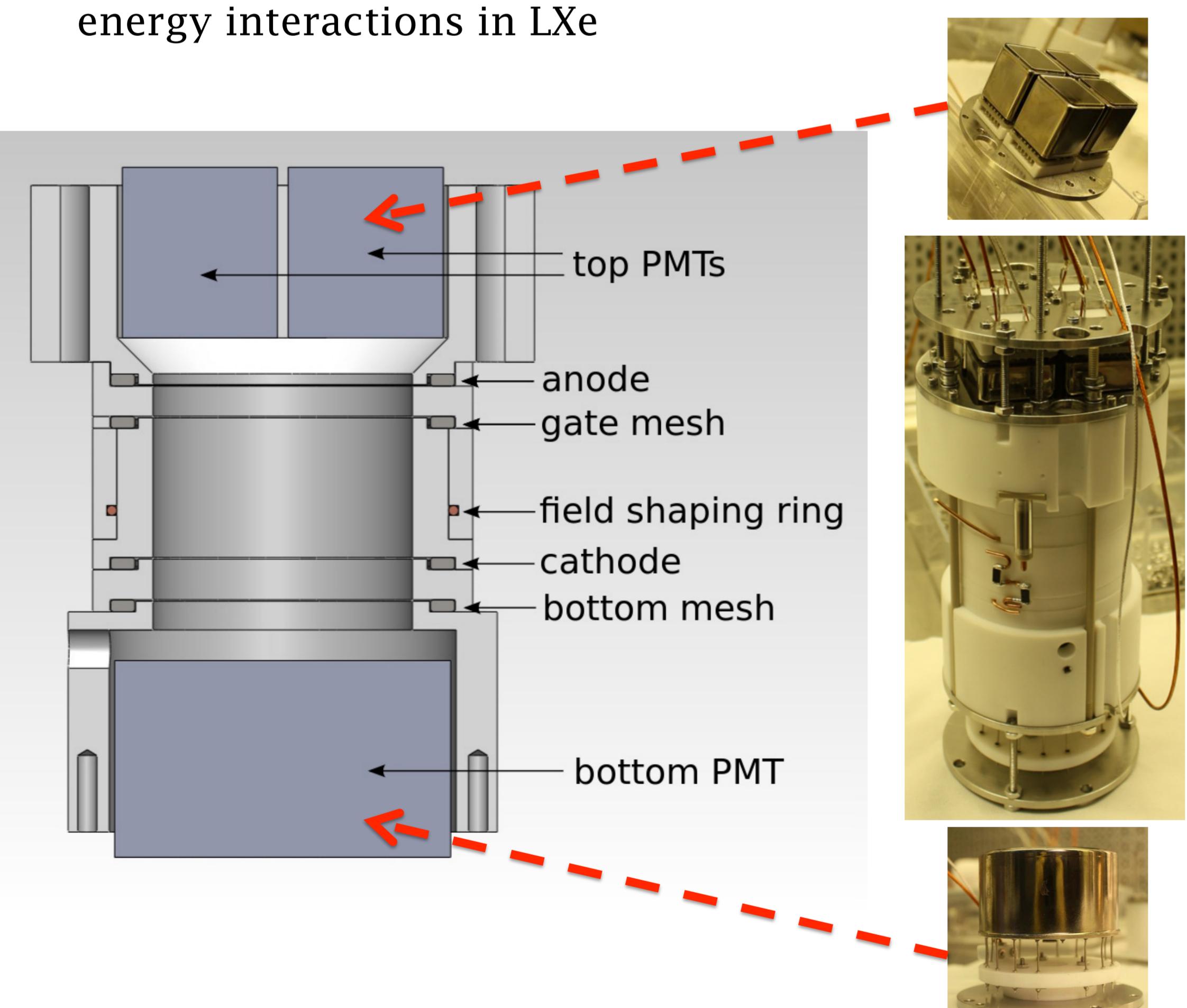
- Light Yield = Photoelectrons / Energy
- Charge Yield = Free Electrons / Energy



Given an electronic or nuclear recoil at a certain energy in an electric field, how much light and charge do you expect to be produced?

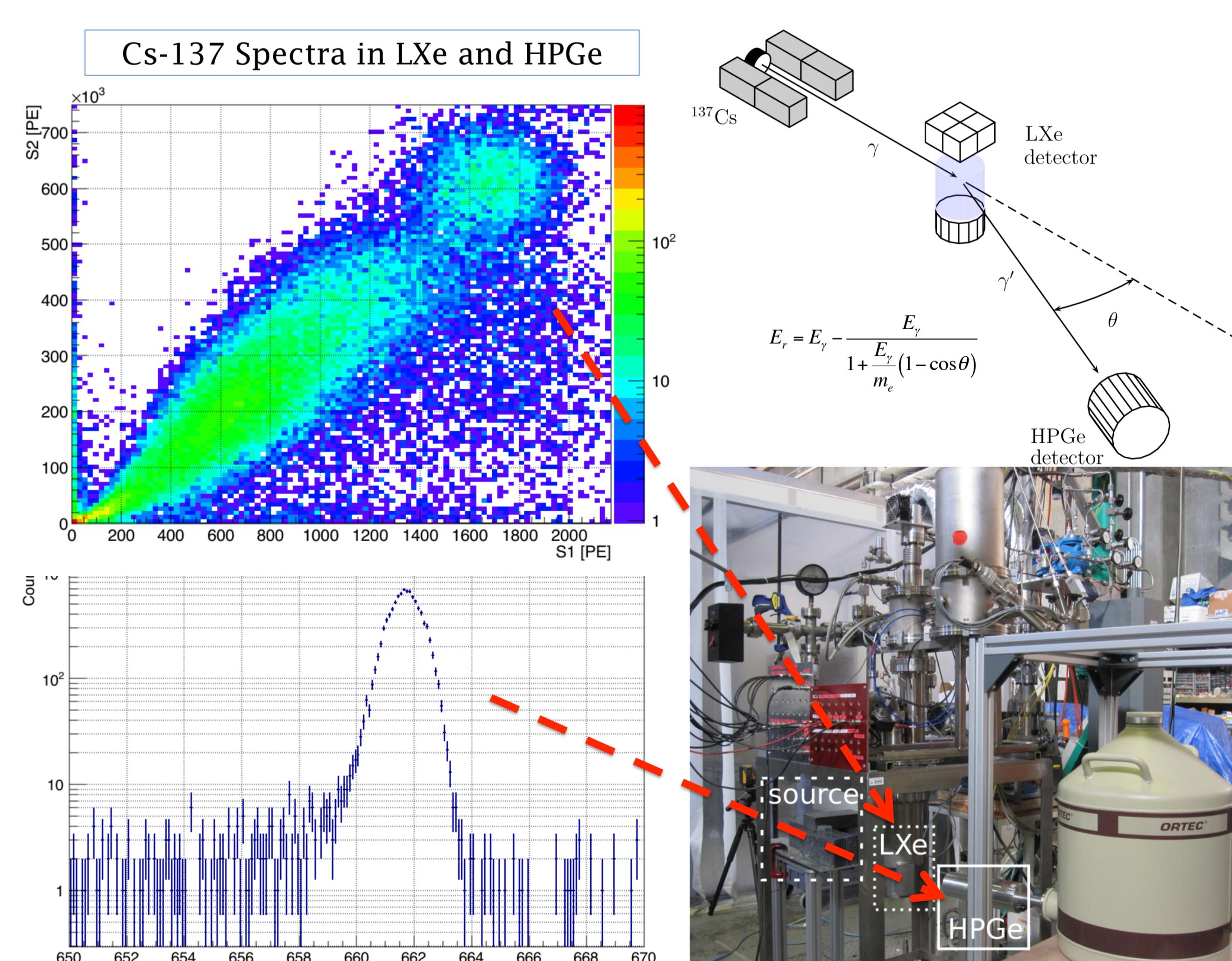
neriX Detector

- Dual-phase LXe Time Projection Chamber for measuring nuclear and electronic recoils in Xenon
 - Small size and minimal materials surrounding fiducial volume make this detector well suited for measurements of light and charge yield
 - Can measure light and charge yield as a function of energy and drift field
- Goal of neriX is to improve our understanding of low energy interactions in LXe

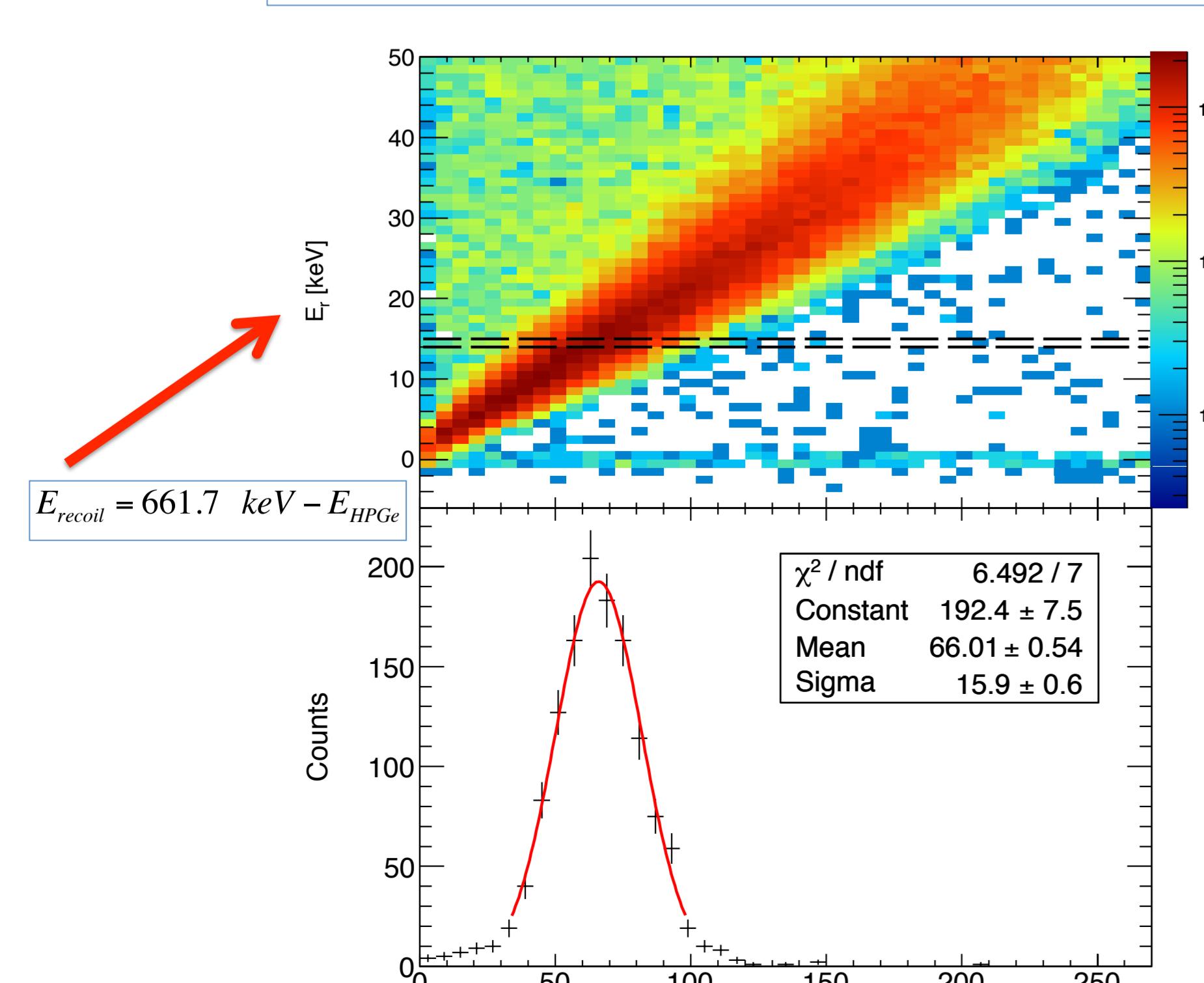


Compton Coincidence Technique

- Photons Compton scatter in LXe then deposit remaining energy in HPGe detector



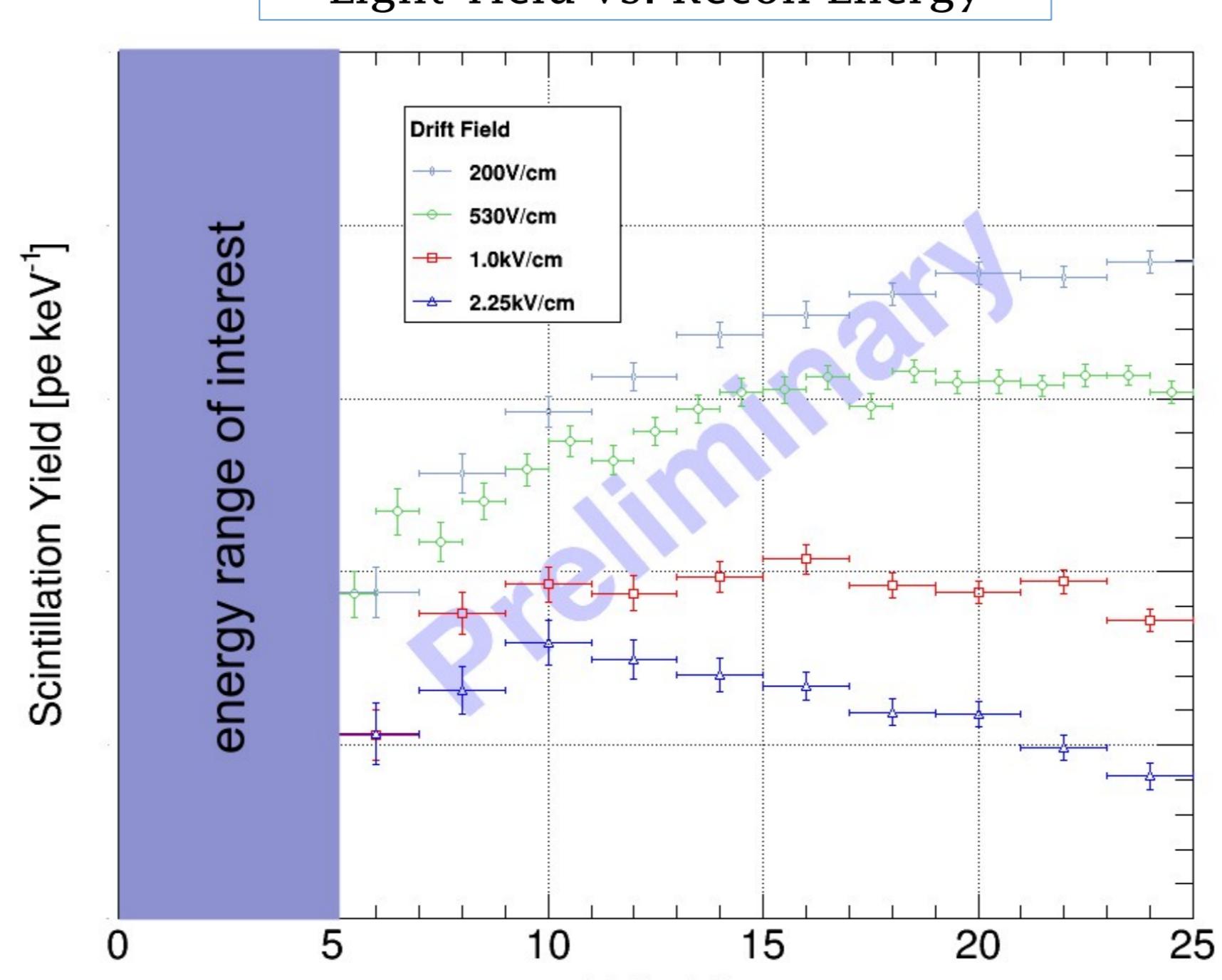
Energy Deposited in LXe vs. Prompt Scintillation Light (S1) - 490 V/cm



Preliminary Electronic Recoil Results

- By taking slices of 1-2 keV in the recoil energy vs. S1 and S2 spectra we can determine the light and the charge yield respectively

Light Yield vs. Recoil Energy



- Expected anti-correlation present
- Results shown are preliminary - light and charge yields were both measured down to 1 keV

Charge Yield vs. Recoil Energy

