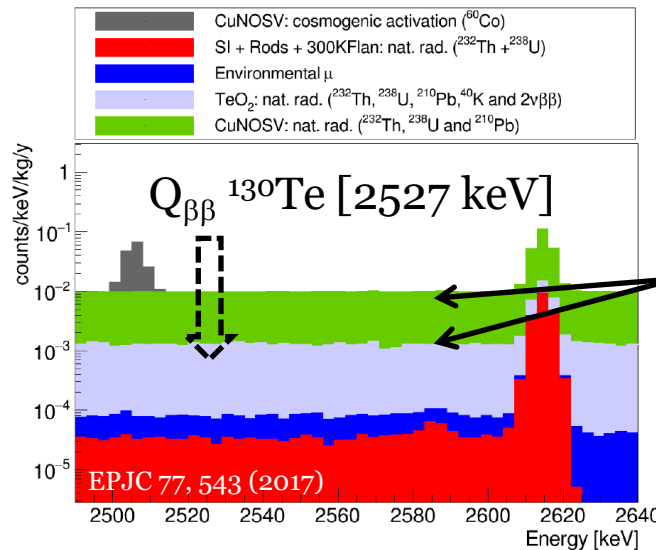
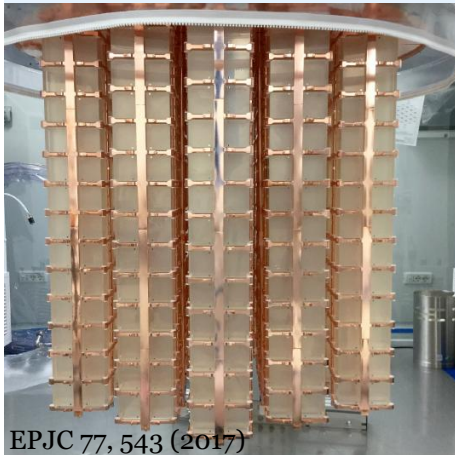


# Full alpha background rejection in a CUORE-size $\text{TeO}_2$ bolometer using a Neganov-Luke-effect light detector



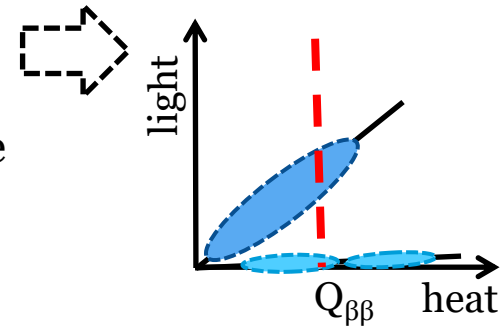
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**CUORE:**  
 988 0.75-kg  $\text{TeO}_2$   
 bolometers



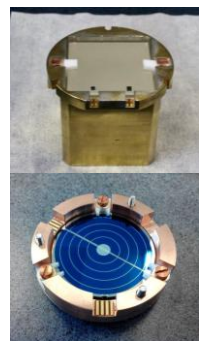
Dominant background comes from degraded-energy  $\alpha$  particles close to the detector surface

Cherenkov radiation detection



100 eV light signals expected  
 high performance optical bolometers are needed  
 → **Neganov-Luke-enhanced light detectors**

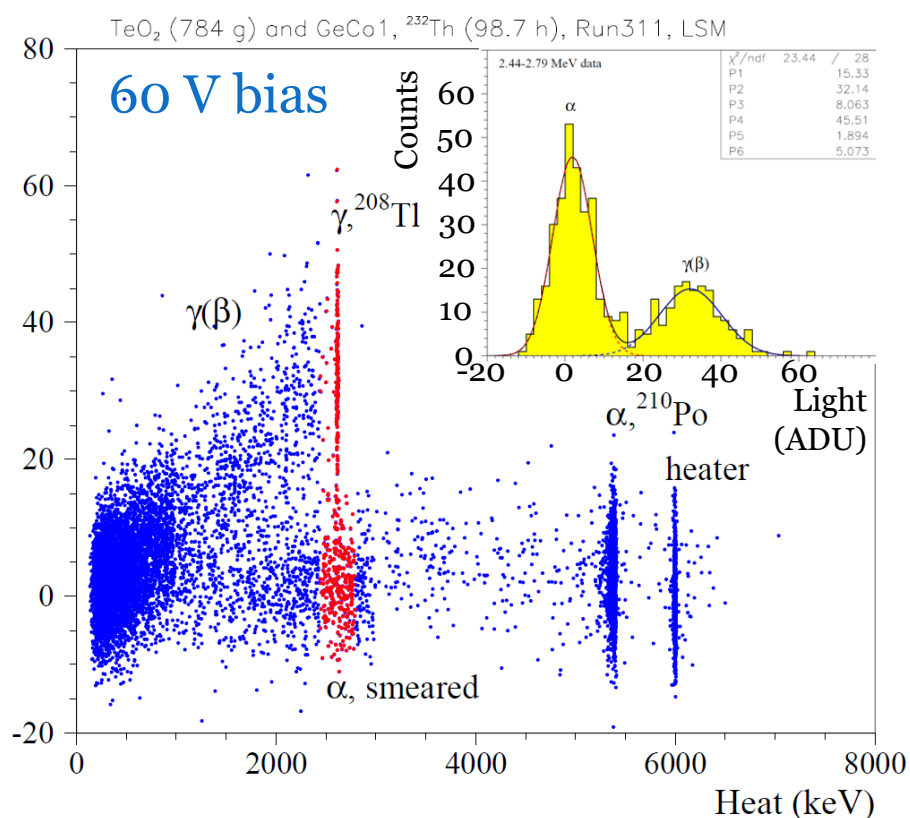
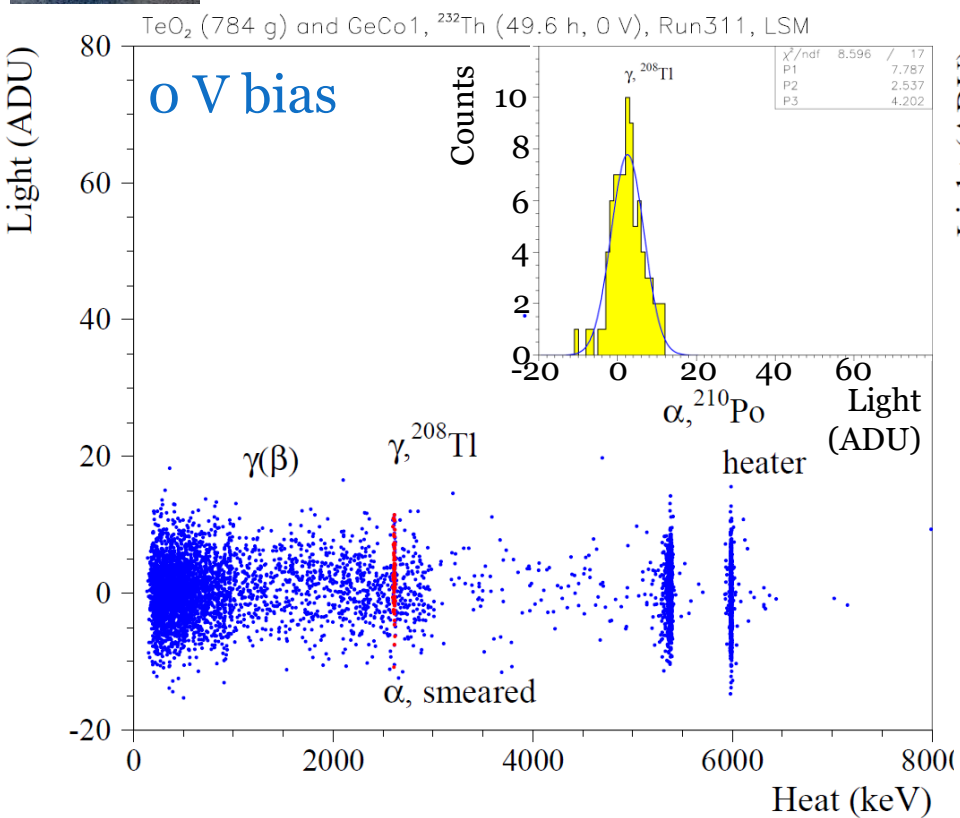
The light detector signal is amplified by an electric field doing work on the electron-hole pairs generated by the collected photons



Test with a 0.78-kg  $\text{TeO}_2$  bolometer & a Neganov-Luke light detector in the EDELWEISS set-up at Laboratoire Souterrain de Modane (France) [L. Bergé et al., PRC 97, 032501(R) (2018)]

### Neganov-Luke light detector performance

Electrode bias	Baseline RMS	Signal/Noise
0 V	108 eV	0.6
60 V	10 eV	7



A **99.9%  $\alpha$  rejection** – with **96 % acceptance for  $\beta(\gamma)$**  – has been demonstrated with a **CUORE-size  $\text{TeO}_2$  bolometer** for the first time