Bolometers are primed to search for rare events, like Dark Matter (DM) interactions or neutrino-less double beta decay (0νBB):
- superb energy resolution (0.1%) and efficiency;
- large variety of targets;
- low intrinsic background;
Moreover, IF EQUIPPED WITH SENSITIVE LIGHT DETECTORS, they can REJECT THE BACKGROUND due to α’s (for 0νBB) or to electrons (for DM interactions) exploiting the different light yield of different particles.

**CUORE**

(0. Cremonesi’s talk and posters of L. Canonica, J. Cushman, K. Han and K. Lim)

1 ton of TeO₂ bolometers operated at ~10 mK to search the 0νBB of 130Te [1]

**Detector features:**
- 98% of 130Te arranged in 19 towers
- 206 kg of natural 130Te
- Expected energy resolution of about 5 keV FWHM at 0νBB energy
- Background target: 10⁻² counts/keV/kg/y

Main source of background: α contaminations of the detector materials

BUT

the experience gained in view of CUORE showed that we are reaching the ultimate level in the development of cleaning procedures for the detector materials

**Why CALDER light detectors?**

TeO₂ does not scintillate but electrons, in contrast to α’s produce Cherenkov radiation [3] (N. Casali’s poster)

**LUCIFER**

[See K. Schaeffner’s poster]

ZnSe scintillating bolometers to search the 0νBB of 130Se (but advanced R&D also on the search of 136Xe using ZnMoO₄) [2]

**GOALS:**
- Achieve ~zero background in the 0νBB region (2997 keV)
- Reach 90% CL sensitivity on 0νBB of the order of 10⁻²⁵ years

**Detector features:**
- 36 ZnSe crystals - coupled to light detectors - for a total mass of ~17 kg;
- almost 9 kg of 98% enriched 130Se;
- expected resolution of 10 keV at 0νBB energy FWHM

**Why CALDER light detectors?**

LUCIFER could become a multi-purpose detector: 0νBB + Dark Matter searches

- Preliminary studies show that ZnSe has an energy threshold of ~ 2.4 keV
- The low threshold guarantees sensitivity in the WIMPs interaction region (<30 keV)

Light detectors with noise <20 eV would allow to reject interactions and reach a background of 10⁻² counts/keV/kg/y

Light detectors with noise <20 eV would allow to reject the interactions due to electrons in the WIMPs region

**REFERENCES**

2. J.W. Beeman, Advances in High Energy Physics, 2013 (http://dx.doi.org/10.1155/2013/237973)