The CROSS Experiment: Unveiling the Mysteries of Neutrinos by Superconductivity Methods

Hawraa Khalife

Process

Neutrinoless double beta decay:

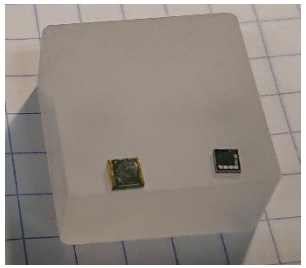
$(A,Z) \rightarrow (A,Z+2) + 2e^-$

Its observation will confirm the Majorana nature of ν

$(\boldsymbol{\nu = \bar{\nu}})$

How to investigate?

using bolometers which are low temperature detector (~10 mK)



Difficulties

very low rate of the process

⬇

An experiment has to be performed with radio pure large-mass high-resolution detectors and **negligible radioactivity** from anything except the nucleus under study

⬇

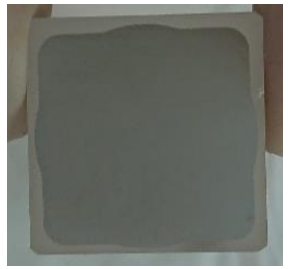
Controlling the background is crucial

CROSS

provide the crystal surface with **pulse shape modification capability** achieved by depositing superconductive Al film on the crystal surface

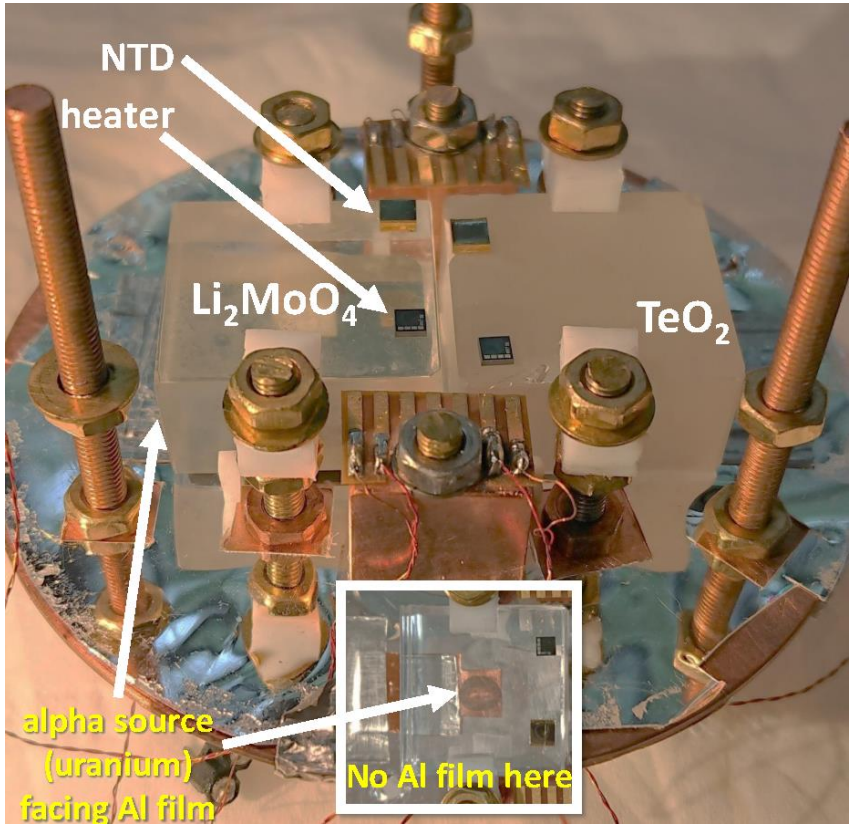
⬇

Reject the background due to surface radioactive contamination



MILANO 22-26 JULY 2019 LTD-18 LOW TEMPERATURE DETECTORS

European Research Council



Rise-time (ms)

β/γ
(bulk events)

Uranium alpha source
facing Al film
(surface events)

counts / bin

DP=6.8

rise-time (ms)

Energy (keV)