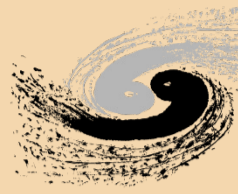


Transition-Edge Sensor Microcalorimeter Development for Particle Physics at IHEP

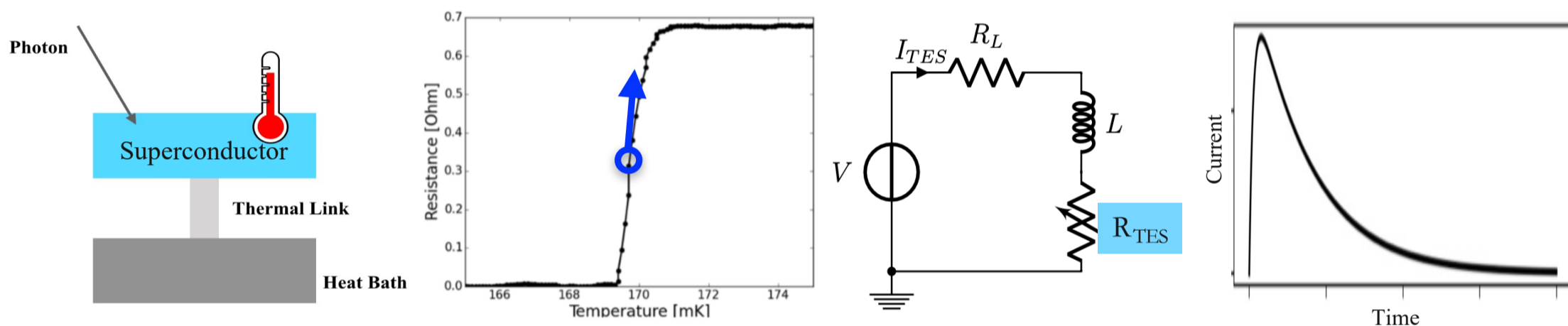
The **transition-edge sensor (TES)** is a type of thermal equilibrium superconducting detectors that offers **excellent energy resolution**, a **wide dynamic range**, and **high quantum efficiency**. The Group of Low-Temperature Detectors at IHEP develops TES microcalorimeters for neutrino-less double beta decay ($0\nu\beta\beta$) experiments and high energy astrophysics missions.



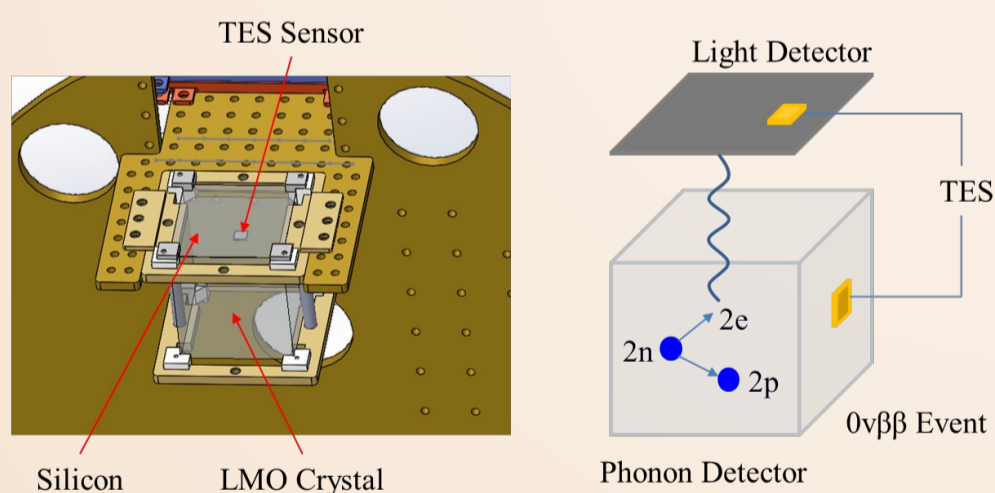
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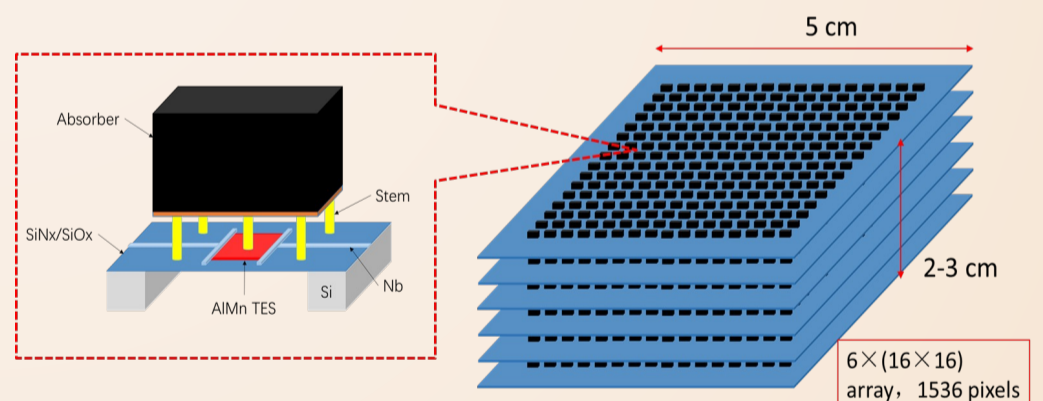
Transition-edge sensor: towards better energy resolution



Neutrino-less double beta decay ($0\nu\beta\beta$): Majorana particle?



511 keV space mission



Science Goal:

- Validate the Majorana theory by detecting the $0\nu\beta\beta$ event of ^{100}Mo isotope
- Discover new physics beyond the standard model of particle physics.

Tech. Target:

- resolution: < 5 keV @ 3.034 MeV
- response time: 10-100 μs

Science Goal:

Origin of positron and its distribution in the center of the Milk Way.

Tech. Target:

- saturation: $E > 511$ keV
- resolution: $E/\Delta E > 1000$
- focal plan detector area: > 10 cm² (single layer)
- efficiency: 93% @ 511 keV

Future Work

1. TES energy resolution improvement
2. Large array fabrication and uniformity examination