

## **Establishing Transition-Edge Sensor Technology for Advanced Nuclear Detection at CNL**

The establishment of advanced nuclear detection technology is critical for enhancing security and monitoring capabilities of nuclear materials. At CNL, we are focused on implementing transition-edge sensor (TES) technology to achieve superior detection performance over traditional techniques such as high-purity germanium detectors. TES sensors are renowned for their high resolution and sensitivity, making them highly effective for applications such as neutrino detection via CEvNS (for monitoring nuclear spent fuel or reactors and dark matter detection), and gamma and alpha spectroscopy (for special nuclear materials detection). Our project involves laying the foundational infrastructure, performing detailed simulations, and developing the initial designs for TES sensors for such applications. By integrating this technology, we aim to significantly improve the detection capabilities over current methods such as scintillating semiconductors. This poster will present our ongoing efforts in infrastructure setup, simulation results, and preliminary sensor development. The anticipated outcome is to establish TES technology to provide enhanced accuracy and reliability in nuclear detection at CNL.

**Primary author:** Dr YAMANI, Zahra (CNL)

**Presenter:** Dr YAMANI, Zahra (CNL)