

# Superconducting detector

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GPPU Experimental Point (GEP): 4

## *Goal of Study*

Superconducting detectors are widely used in particle physics, nuclear physics and astrophysics research. In this course, students will learn the basics of superconducting detector principles and readout.

## *Contents*

This course focuses on superconducting detectors for rare event searches, providing students with broad knowledge of the field, including cryogenic systems and readout electronics. Students will **gain hands-on experience** in the following activities:

- Characterization of superconducting detectors
- Calibration using gamma rays
- Data analysis for rare decay searches

In the event that the cryocooler does not operate properly, the hands-on activities may be replaced with exercises using previously collected data.

***Textbook and References***

Ohno et al., Superconducting Transition Edge Sensor for Gamma-Ray Spectroscopy, IEICE TRANS. ELECTRON., VOL.E100–C, NO.3 MARCH 2017

***Progress Schedule***

- Day 1
  - Lecture: Basics of Superconducting Detectors and Cryocoolers
  - Experiment: Cryocooler Setup and Cooling Initiation
- Day 2
  - Experiment: Characterization of Superconducting Detectors
- Days 3—4
  - Experiment: Gamma-ray measurements and data analysis

***Other Details***

<b>Course Period</b>	Fall 2025
<b>Place</b>	ニュートリノ科学研究センター
<b>Number of Students</b>	1—3
<b>Evaluation method</b>	The evaluation method will based on report of the experiment (100 %).

***In Addition***