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## Coevolution of the technology on Transition-Edge-Sensor spectrometer and its application to fundamental science

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Over the last few years, the Transition-Edge-Sensor spectrometer (TES) has been rapidly matured. This review presents the latest examples of the application of TES to the fundamental sciences; e.g., the beam-line environments for X-ray, the laboratory experiment for the neutral atom spectroscopy, and the space application. The application for the fundamental science is extraordinarily demanding and challenging for the detector, and thus it expands the horizon of the TES application. In general, one has to start with characterizing the requirement of the experiments, design the entire system with great care, and operate the system for a required period. There are always many challenges to obtaining the nominal performance of the TES at the experimental site. The conceivable factors are the mechanical vibration, electrical interference, the magnetic shields, the aperture design and materials, and data processing and analysis. All of them need to be carefully considered; otherwise the science goal will not be achieved. This requires collective efforts from many aspects. I will present our examples of the application of NIST TESs to fundamental physics and discuss future prospects.

### **Less than 5 years of experience since completion of Ph.D**

N

### **Student (Ph.D., M.Sc. or B.Sc.)**

N

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