What Thermal Kinetic Inductance Detectors (TKIDs) can offer for X-ray imaging spectroscopy

TKIDs are a variation of the Microwave Kinetic Inductance Detector (MKIDs) principle, a novel superconducting detector type with very attractive capabilities. As MKIDs combine the significant advantages of low temperature detectors with the scalability of CCDs, they are very promising for diverse scientific disciplines. I will explain the basic MKID working principle and show how they are able to count single particles or photons between 10^{-1} and 10^{6} eV, achieve µSec time resolution and determine individual particle energies at the same time. I'll further demonstrate how their inbuilt frequency domain multiplexing allows MKID arrays to scale up to kilo- or even megapixel sizes, the most important advantage MKIDs have over competing low temperature detectors. TKIDs are optimized for the detection of X-rays and higher energies by being partly suspended on a freestanding membrane. They operate as microcalorimeters and have the potential to achieve time and energy resolutions comparable to transition edge sensors (TESs). But most importantly, as TKIDs still profit from the passive MKID multiplexibility, they offer a unique and feasible way to megapixel-range detector arrays for X-ray imaging spectroscopy. I will present how our first TKID prototypes, even though considerably saturated, achieved an energy resolution of 75 eV at 5.9 keV and will explain how by slightly sacrificing dynamic range, TKIDs should in principle be able to even beat TESs in energy resolutions. If time permits, I'll also give a very brief overview of MKID applications in particle physics and the search for life outside our solar system.