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From milliKelvin to MegaKelvin: Probing the hot universe with cool detectors

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The Universe is a wild and wooly place, simultaneously very cold (with a CMB temperature of 2.7 K) and exceedingly hot (full of $\sim 10^6$ K intergalactic x-ray emitting gas), and made up of things like the strangely named Cold Dark Matter (whose temperature in our neighborhood of the Milky Way is $\sim 10^8$ K). In an effort to understand the inner workings of the Universe, physicists have increasingly been turning to detectors that are operated at cryogenic temperatures (down to 10^{-3} K). This talk will discuss the principles behind cryogenic detectors and microcalorimeters, and their applications at the frontiers of particle physics and astrophysics.