Cold Detectors Technology: from Astrophysics to Quantum computing

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The R&D for X-ray spectro-imaging micro-calorimeters applied to X-Ray Astrophysics experiments initiated a line of research that has several important outcomes including for some key aspects of the R&D on Quantum Computing.

This lecture introduces first the detection principle of the X-ray Astrophysics and the Spectro-imaging at very high spectral resolution. It explains why the detectors should be very cold and show the corresponding cryogenic constraints with the trade-off for the spatial micro-calorimeters arrays. The main choices for developing this technology especially in terms of the associated cold electronics and management of the heat flow are presented. The application of these techniques for B-BOP/Safari & Si Based Cryo-Qubits are shown as an appealing outcome.