

Fluorescence Measurements and Perspectives with Superconducting Tunneling Junctions (STJ)

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The use of STJ's as absorber material for spectroscopic Soft X-Ray detection is very promising in terms of energy resolution and count rate capabilities. Because of the low excitation energy of Cooper pairs in a superconductor (few meV) three orders of magnitude more charge carriers than in a Si-detector are produced per photon. The ultimate resolution limit for such a detector is therefore in the order of a few eV instead of a few 100 eV in the soft X-ray regime. The first commercially available 36 pixel STJ detector is characterized and implemented into synchrotron radiation beamline operation. The achieved resolution is 10eV for 500 eV photons and 50eV for 1500eV photons with a maximal count rate of 10 kcps per pixel. This allowed for element specific Soft X-Ray fluorescence measurements at the P04 beamline at Petra III, DESY.

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