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Characterization of a Ti/Au TES with Au/Bi absorber under AC and DC bias

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Transition Edge Sensors (TESs) are used as very sensitive thermometers in microcalorimeters aimed at different wavelengths detection. In particular, for soft X-ray astrophysics, science goals require very high resolution microcalorimeters which can be achieved with TESs coupled to suitable absorbers. For many applications there is also need for a high number of pixels which need to be multiplexed in the readout stage. Frequency Domain Multiplexing (FDM) is a common scheme and is the baseline proposed for the ATHENA mission. FDM requires biasing the TES in AC at MHz frequencies. Recently there has been reported degradation in performances under AC with respect to DC bias. In order to assess the performances of TESs to be used with FDM, it is thus of great interest to compare the performances of the same device under both types of bias. This means using two completely different setups and characterization protocols.

We report in this work a preliminary comparison of the characterization of a single pixel with a Ti/Au TES, performed under DC and AC bias in two different facilities. Dynamical parameters and noise are compared in both cases showing compatible results and has allowed definition of protocols for future AC/DC comparison of these devices.

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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