Contribution ID: **206** Type: **Oral Presentation**

Excess Johnson noise in non-uniform TESs

Friday, July 26, 2019 11:45 AM (15 minutes)

TES based detectors nowadays show performances which make them very attractive for many applications. Despite these successes, there have been many reports of excess noise in TESs which still lack physical explanation. More specifically, it is a well known experimental fact that in many cases excess noise in TESs can be described accurately by assuming an increased Johnson noise power, which has been parametrised by a factor labelled with the letter M. A part of this M factor can be explained by non-equilibrium thermodynamical effects. However, many experiments have shown that this effect does not explain the excess noise completely. There also have been several observations reported of the scaling of the M-factor with the internal thermal conductivity of the TES, and with the magnitude of the α and β parameter.
In this paper we propose a mechanism which provides a natural coupling between the different observed M-factor scalings, based on the notion that a spatially non-uniform distribution of the α parameter value is an essential ingredient for the creation of a Johnson noise power beyond what is expected based on thermodynamics. We will show that the proposed mechanism predicts the scalings which have been observed and reported by several authors.

Less than 5 years of experience since completion of Ph.D

N

Student (Ph.D., M.Sc. or B.Sc.)

N

Primary authors: VAN DER KUUR, Jan (Netherlands Institute for Space Research); GOTTARDI, Luciano (SRON - Netherlands Institute for Space Research); AKAMATSU, Hiroki (Netherlands Institute for Space Research); Dr BRUIJN, Marcel (SRON - Netherlands Institute for Space Research); Mr RIDDER, Marcel (SRON Netherlands Institute for Space Research); Mr NAGAYOSHI, Kenichiro (SRON Netherlands Institute for Space Research); Mr RAVENSBERG, Kevin (SRON Netherlands Institute for Space Research); JACKSON, Brian (Netherlands Institute for Space Research)

Presenter: VAN DER KUUR, Jan (Netherlands Institute for Space Research)

Session Classification: Orals LM 001

Track Classification: Low Temperature Detector Development and Physics