Contribution ID: **23** Type: **Poster**

Fabrication of phononic-isolated kinetic inductance detectors

Thursday, 25 July 2019 18:45 (15 minutes)

Kinetic inductance detectors (KID) have received increased interest due to their low noise, and scalability to large format arrays required by next generation of astronomical telescopes. The development of KIDs has progressed rapidly, with very low noise equivalent power demonstrated by several groups and KIDs arrays implemented in several ground-based and air-borne instruments. In this paper, we describe a new fabrication process which consists of a membrane isolated KID incorporating a phononic bandgap structure tuned to block recombination phonons from escaping to the thermal bath. This architecture is designed to increase the quasi-particle lifetime and results in increased responsivity to signal photons and lower noise. These devices have been fabricated as lumped-element resonators with hafnium inductors and niobium capacitors on low stress silicon nitride and silicon-on-insulator membranes. We discuss the fabrication process, which uses a combination of sub-micron laser based direct write lithography and nanoscale electron beam lithography.

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

N

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

N

Primary authors: Mr DENIS, Kevin (NASA GSFC); Dr DE VISSER, Peiter (SRON); Dr MAASILTA, Ilari (University of Jyvaskyla); Dr PUURTINEN, Tuomas (University of Jyvaskyla); Dr ROSTEM, Karwan (University of Maryland Baltimore); Dr WILLIAMS, Elissa H. (NASA GSFC); Dr WOLLACK, Edward J. (NASA GSFC)

Presenter: Mr DENIS, Kevin (NASA GSFC)

Session Classification: Poster session

Track Classification: Low Temperature Detector fabrication techniques and materials