

**Space Qualification of High Current Density
Nb/Al-AlO_x/Nb Junctions for HERSCHEL/HIFI/Channel 1
(480-640 GHz)**

I. Péron^{1,2}, G. Faury¹, Y. Delorme², F. Dauplay², B. Lecomte², M. Salez²
and K.-F. Schuster¹

¹ IRAM, Domaine Universitaire de Grenoble, 38406 St Martin d'Hères, France

² DEMIRM, Observatoire de Paris, 77 Avenue Denfert Rochereau, 75014 Paris, France

Submillimeter astronomy with SIS mixers in space offer access to new wavelength windows and unsurpassed sensitivity. However little is known about the behavior of these devices in space [1].

We report on the radiation hardness tests and thermal cycling, including bake-out tests for high current density Nb/Al-AlO_x/Nb mono and twin junctions for HERSCHEL/HIFI/Channel 1. The process of these junctions is derived from the conventional SAC-SNE Process (Self Aligned Contact – Selective Niobium Etching) but uses negative resist electron beam lithography for junction definition [2] .

References

[1] H. van de Stadt, J.R. Gao, Th. De Graauw, W. Luinge, K. Wildeman, J. Wijnbergen, “Assessment of submillimeter heterodyne mixers for space applications”, Proceedings of the 30th ESLAB Symposium on Submillimeter and Far-Infrared Space Instrumentation, September 1996.

[2] I. Péron, P. Pasturel, and K-F. Schuster, “Fabrication of SIS junctions for space borne submillimeter wave mixers using negative resist e-beam lithography”, IEEE Transactions on Applied Superconductivity, March 2001.