

# **Studies of Breakdown in High Gradient X-band Accelerator Structures Using Acoustic Emission\***

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## **Abstract**

X-band accelerator structures meeting the Next Linear Collider (NLC) design requirements have been found to suffer damage due to RF breakdown when processed to high gradients. Improved understanding of these breakdown events is desirable for the development of structure designs, fabrication procedures, and processing techniques which minimize structure damage [1]. Acoustic emission sensors attached to an accelerator structure can detect both nominal and breakdown RF pulses [2]. Using an array of acoustic sensors, we have been able to pinpoint both the cell and azimuth location of individual breakdown events. This allows studies of breakdown time and position sequences so that underlying causes can be determined. In this paper we present acoustic emission sensor data and analysis from the breakdown studies in several x-band accelerator structures.

[1] C. Adolphsen, et al. 'X-band Accelerator Structure High Gradient Studies', PAC 2001.

[2] M. Gangeluk, et al. 'Acoustic Monitoring System of RF breakdowns Inside the Electrodynamic Structure at Kurchatov SR Source Accelerator', Proc. of the Fourth European Particle Accelerator Conference, London, 1994, p.1986

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