Abstracts

Performance of a superconducting detector circuit using a Schottky barrier diode for bandwidth modulation

M.W. Hosking. "Performance of a superconducting detector circuit using a Schottky barrier diode for bandwidth modulation." 2001 MTT-S International Microwave Symposium Digest 01.1 (2001 Vol. I [MWSYM]): 503-506 vol.1.

This paper describes some operational characteristics, at microwave frequencies, of a detector consisting of a Schottky barrier diode, integrated within a superconducting thin-film YBCO matching circuit. Emphasis is placed on the practical, operational characteristics, rather than the (better understood) transport properties of the semiconductor. The temperature dependence of key characteristics is analysed and, in particular, the change of video bandwidth with decreasing temperature. Because the bandwidth is also a function of bias current, a novel means of controlling, optimising, or modulating the bandwidth is proposed. In a system application, an unwanted variation in bandwidth could result in either a decrease in tangential sensitivity, or loss of data rate, with a consequent degradation of performance. It is proposed and demonstrated that the application of a small forward bias to the diode can be used to vary this bandwidth: a feature which could be utilised in practice to adaptively modulate, or control, the sensitivity of a detector system.

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