

Experimental Study on Microwave Attenuation in Josephson Junction Stripline

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The attenuation of millimeter waves (70-100 GHz) propagating along Josephson junction stripline had been measured by pattern recognition near gap voltage and proximity current bump. Test series arrays of 2000, 3000, and 4000 Josephson junctions with the area of $12 \mu\text{m} \times 38 \mu\text{m}$ had two sub-arrays with 50 junctions at both ends. The arrays were fabricated with and without applying a plasma nitridation process to Nb ground plane. The effects of a nitridation process measured by the pattern recognition near gap voltage and proximity current bump were about 1.3-1.7 dB and 1.6-1.8 dB, respectively. This means that the last sub-arrays with a nitridation process receive 26-34 % more power than those without a nitridation process.

Keywords: Josephson junction, microwave attenuation, nitridation process