

DETECTION OF THz RADIATION FROM INTRINSIC JOSEPHSON JUNCTIONS

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We have studied terahertz emission from current-biased intrinsic Josephson junctions (IJJs). Large IJJ stacks, which include 100-200 junctions, with dimensions of $290 \times 90 \mu\text{m}^2$ were formed on $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_y$ single crystals by standard photolithography and Ar ion milling. In order to detect terahertz radiation from these stacks, we also fabricated a small IJJ mesa with dimensions of $5 \times 5 \mu\text{m}^2$ on a different crystal and used as detector because IJJs can also response the terahertz wave. At 4.2 K, the voltage at a constant bias current for the detector mesa were measured while scanning the bias voltage of the oscillator mesa. The voltage of the detector mesa showed the peaks when the voltage of the oscillator mesa was 0.12 and 0.22 V. This indicates that the oscillator mesa emits a strong radiation at these voltages. From the Josephson voltage-frequency relation, it is found that these voltages correspond 0.57 and 0.97 THz. These frequencies are not inconsistent with the cavity resonance frequencies.