

## Excitation mode characteristics in Bi2212 rectangular mesa structures

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The continuous and coherent electromagnetic waves (EMWs) at THz frequencies with a power of a few  $\mu\text{W}$  can be generated from mesa structures of single crystalline  $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+\delta}$  (Bi2212)<sup>1</sup>. The emission frequency has been understood to follow two conditions simultaneously: the ac-Josephson effect and the cavity resonance condition<sup>2</sup>. Recently, we have studied the shape effect of the emission. The obtained results strongly suggest that the cavity resonance condition may be not primarily important for determination of the frequency but the ac-Josephson effect may be responsible for the emission of EMWs from the mesa. Examples of the tunable emission in wide frequencies will be shown.

<sup>1</sup>L. Ozyuzer *et al.*, Science **318**, 1291 (2007).

<sup>2</sup>K. Kadowaki *et al.*, J. Phys. Soc. Jpn. **79**, 023703 (2010).