

Abstract Submitted
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Coherent THz radiation with geometrical full wave length resonance in single crystalline Bi2212¹ T. KASHIWAGI, K. YAMAKI, M. TSUJIMOTO, K. DEGUCHI, T. KOIKE, N. ORITA, R. NAKAYAMA, H. MINAMI, T. YAMAMOTO, K. KADOWAKI, Graduate School of Pure and Applied Sciences, University of Tsukuba — Recently, continuous terahertz emission has been observed from a mesa structure of $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+\delta}$ (Bi2212) single crystals.² From previous experimental results, it has been established that the emission frequency is determined by both ac Josephson effect and geometrical cavity resonance condition. However, in the recent experimental results have shown that the above condition is often violated keeping the ac Josephson effect to be still valid. It seems that the half wave length resonance mode disappears and the full wave length resonance mode emerges resulting in the double frequency as a fundamental mode. This can be found not only in the rectangular mesas but also in square mesas. In the case of 80 μm width mesa, for example, it can generate 930 GHz as a fundamental mode with up to 3rd harmonics corresponding to 2.8 THz. Although the origin of this full wave length resonant fundamental mode is not well understood, it is worth obtaining higher frequencies for practical applications.

¹This work is in part performed in collaboration with Dr. Wai Kwok and his group in Argonne National Lab.

²L. Ozyuzer et al., Science **318** (2007) 1291.

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