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**Spectral investigation of hot-spot and cavity resonance effects on the terahertz radiation emitted from high-$T_c$ superconducting $Bi_2Sr_2CaCu_2O_{8+\delta}$ single crystal mesa structures**[1] KAZUO KADOWAKI, Faculty of Pure & Applied Sciences, University of Tsukuba, Japan, CHIHARU WATANABE, Graduate School of Pure & Applied Sciences, University of Tsukuba, Japan, HIDETOSHI MINAMI, Faculty of Pure & Applied Sciences, University of Tsukuba, Japan, TAKASHI YAMAMOTO, Environment & Energy Materials Division, NIMS, Japan, TAKANARI KASHIWAGI, Faculty of Pure & Applied Sciences, University of Tsukuba, Japan, RICHARD KLEMM, Department of Physics, University of Central Florida — Terahertz (THz) electromagnetic radiation emitted from high-$T_c$ superconducting $Bi_2Sr_2CaCu_2O_{8+\delta}$ mesa structures in the case of single mesa and series-connected mesas is investigated by the FTIR spectroscopic technique while observing its temperature distribution simultaneously by a SiC photoluminescence technique. Changing the bias level, sudden jumps of the hot-spot position were clearly observed. Although the radiation intensity changes drastically associated with the jump of the hot spot position, the frequency is unaffected as long as the voltage per junction is kept constant. Since the frequency of the intense radiation satisfies the cavity resonance condition, we confirmed that the cavity resonance is of primarily importance for the synchronization of whole intrinsic Josephson junctions in the mesa for high power radiation.

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