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A role of temperature inhomogeneity and hot-spot formation on the THz emission from high-T_c superconducting intrinsic Josephson junction mesa devices CHIHARU WATANABE, HIDETOSHI MINAMI, TAKEO KITAMURA, KENTARO ASANUMA, KURAMA NAKADE, TAKAKI YASUI, YOSHIHIKO SAIWAI, YUKI SHIBANO, University of Tsukuba, TAKASHI YAMAMOTO, National Institute for Materials Science, TAKANARI KASHIWAGI, University of Tsukuba, RICHARD KLEMM, University of Central Florida, KAZUO KADOWAKI, University of Tsukuba — It is well known that the mesa device fabricated from single crystalline $Bi_2Sr_2CaCu_2O_{8+\delta}$ (Bi2212) gets heated enormously and forms very inhomogeneous temperature distribution and often "hot-spot," where temperature is well above T_c when it is current biased and turns to the resistive state. One very surprising phenomena, there is that the mesa can still emit THz radiation even in such a hectic thermal condition in the mesa if two conditions are satisfied: ac-Josephson effect and the cavity resonance condition. In order to understand such a curious behavior we have carried out photoluminescent measurement to investigate temperature inhomogeneous distribution and emission spectra simultaneously while the mesa is generating strong THz emission. Furthermore, we were able to control the hot-spot position by shining the LASER beam focused on the mesa to see the interplay between hot-spot formation, inhomogeneous temperature distribution, and THz emission intensity and the frequency. The results will be shown in detail at the meeting.

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