

Terahertz Radiation from $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+\delta}$ Intrinsic Josephson Junctions above Critical Current

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Two types of THz radiation from mesa structures of $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+\delta}$ (Bi2212) single crystals have already been reported. One is referred as type IR, and the other is referred as type R. The IR radiation is observed irreversibly when a jump from a branch to lower branch in the I - V curve occurs with reducing bias voltage.¹ The R radiation is observed reversibly in negative dI/dV region of the I - V curve.² In a mesa structure with the size of $80 \times 400 \times 1 \mu\text{m}^3$ fabricated in this work, we found another type of THz radiation referred as type W in addition to the two types of radiation. All types of radiation were detected reproducibly even in a single I - V cycle. The type W emerges in the reversible region of the I - V characteristics at currents higher than those of R and IR radiations. Since the W radiation is observed in the relatively broader current range even above the global critical current of the stacked junctions unlike the two radiations, the mechanism of the W radiation is possibly different from that of the two. Furthermore, the emission power of the type W is the most intensive among the all types observed here and is estimated as the order of μW .

¹L. Ozyuzer, et al., *SCIENCE*, **318**, 5854, 1291-1293 (2007).

²K. Kadowaki, et al., *Physica C*, **468**, 634-639 (2008).