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**Artificially induced hotspots in $Bi_2Sr_2CaCu_2O_8$ mesa terahertz sources**[1] YANG HAO, University of Illinois at Chicago, ULRICH WELP, ALEXEI KOSHELEV, VITALII VLASKO-VLASOV, WAI-KWONG KWOK, Argonne National Laboratory, KAZUO KADOWAKI, University of Tsukuba, TIMOTHY BENSEMAN, Queens College CUNY — Mesa-shaped devices comprising stacked Intrinsic Josephson Junctions (IJJs) in the high-temperature superconductor $Bi_2Sr_2CaCu_2O_8$ can be used as compact sources of coherent terahertz radiation. Achieving high emission levels of THz emission power from these devices depends on efficient synchronization of the approximately 600 IJJs in the stack. Theoretical simulations of stacked IJJs, as well as some empirical results, suggest that thermal inhomogeneity of the stack may enhance THz emission power. There are a number of possible mechanisms by which this might occur, including a hotspot acting as a local resistive shunt for the IJJs (thus altering the spread of bias voltages in the stack and the junction damping dynamics) or by local self-heating reducing the phase-stiffness of the superconducting condensate in critical locations. Here we report results of artificially inducing local heating in these devices with thin film micro-heaters patterned on their surfaces, in order to determine which mechanism(s) could be responsible for self-heating-induced THz emission enhancement.

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