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Comparison of luminescent and scanning laser thermal microimaging of self-heating in $Bi_2Sr_2CaCu_2O_8$ mesa THz sources[1] TIMOTHY BENSEMAN, ALEXEI KOSHELEV, VITALII VLASKO-VLASOV, YANG HAO, WAI-KWONG KWOK, ULRICH WELP, Argonne Natl Lab, COURTNEY KEISER, Northern Iowa University, BORIS GROSS, MATTHIAS LANGE, DIETER KOELLE, REINHOLD KLEINER, University of Tuebingen, KAZUO KADOWAKI, University of Tsukuba — Scanning laser thermal microscopy of stacked $Bi_2Sr_2CaCu_2O_8$ Josephson junction terahertz sources has revealed both electromagnetic cavity resonance modes and strongly non-uniform self-heating in these devices. However, this technique – in which a modulated laser beam is rastered across the surface of a device – excites a number of physical phenomena, and thus the resulting images can be difficult to interpret. Here we compare scanning laser images taken on $Bi_2Sr_2CaCu_2O_8$ mesa THz sources with micro-images collected via a thermoluminescent technique under identical conditions. The latter technique directly measures the device surface temperature, and we find excellent agreement with the scanning laser results, confirming that scanning laser thermal microscopy is indeed primarily probing device temperature.

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