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Tunable terahertz emission from Bi2Sr2CaCu2O8 mesa devices
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Institute of Technology, Turkey, KAZUO KADOWAKI, TAKASHI YAMAMOTO,
University of Tsukuba, Japan — The so-called “terahertz gap,” covering frequencies
from approximately 0.3 to 1.5 THz, is of particular interest for a number of scientific
and security applications, although no bright sources of coherent radiation presently
exist in this range. However, stacks of high-temperature superconducting intrinsic
Josephson junctions are a promising candidate. [1] Here we discuss recent progress
in improving the performance of these devices. In particular, we demonstrate that
via control of bias voltage and operating temperature, the emission from an 80-µm
wide Bi2Sr2CaCu2O8 mesa can be tuned continuously over a frequency range in
excess of 10% in the vicinity of 0.5 THz. We find that as the emission frequency
increases from 0.420 to 0.492 THz, the linewidth increases from <2.25 GHz (limited
by instrument resolution) to ∼9 GHz.


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