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Title:High temperature superconductor terahertz emitters: Fundamental physics and its applications
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Abstract:Coherent and continuous radiation sources of the electromagnetic (EM) waves at terahertz (1 THz = 10¹² c/s) frequencies using a mesa structure fabricated from high temperature superconducting Bi<inf>2</inf>Sr <inf>2</inf>CaCu<inf>2</inf>O<inf>8+δ</inf> single crystals are described with a special emphasis on the physics of the radiation mechanism and the applications. After the intensive studies of many mesas fabricated with different conditions, it is revealed that the ac-Josephson effect works as a primary driving mechanism of the radiation and the cavity resonance needed for stronger radiation plays an additional role to the mechanism, although both are working together while radiating. A prototype of the imaging machine for multipurpose uses has successfully been developed. © 2012 The Japan Society of Applied Physics.
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