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Title:Linewidth dependence of coherent terahertz emission from Bi₂Sr₂CaCu₂O₈ intrinsic Josephson junction stacks in the hot-spot regime
Authors:Mengyue Li (1); Jie Yuan (2); Kinev, N. (3); Jun Li (2); Gross, B. (4); Gue´non, S. (4); Ishii, A. (2); Hirata, K. (2); Hatano, T. (2); Koelle, D. (4); Kleiner, R. (4); Koshelets, V.P. (3); Huabing Wang (1); Peiheng Wu (1)
Author affiliation:(1) Res. Inst. of Supercond. Electron., Nanjing Univ., Nanjing, China; (2) Nat. Inst. for Mater. Sci., Tsukuba, Japan; (3) Kotel'nikov Inst. of Radio Eng. & Electron., Moscow, Russia; (4) Center for Collective Quantum Phenomena in LISA+, Univ. Tubingen, Tu¨bingen, Germany
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Abstract:We report on measurements of the linewidth Δf of terahertz radiation emitted from intrinsic Josephson junction stacks, using a Nb/AlN/NbN integrated receiver for detection. Previous resolution-limited measurements indicated that Δf may be below 1 GHz-much smaller than expected from a purely cavity-induced synchronization. While at low bias we found Δf to be not smaller than ~500 MHz, at high bias, where a hot spot coexists with regions which are still superconducting, Δf turned out to be as narrow as 23 MHz. We attribute this to the hot spot acting as a synchronizing element. Δf decreases with increasing bath temperature, a behavior reminiscent of motional narrowing in NMR or electron spin resonance (ESR), but hard to explain in standard electrodynamic models of Josephson junctions.
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Inspec controlled terms:aluminium compounds - bismuth compounds - calcium compounds - electrodynamics - high-temperature superconductors - Josephson effect - niobium - niobium compounds - nuclear magnetic resonance - paramagnetic resonance - strontium compounds - terahertz waves
Uncontrolled terms:intrinsic Josephson junction stacks - hot-spot regime - linewidth dependence - coherent terahertz emission - linewidth measurements - terahertz radiation - Nb/AlN/NbN integrated receiver - purely cavity-induced synchronization - superconducting - NMR - electron spin resonance - standard electrodynamic models - Bi₂Sr₂CaCu₂O₈ - Nb-AlN-NbN

Inspec classification codes:A7450 Superconductor tunnelling phenomena, proximity effects, and Josephson effect - A7470V Perovskite phase superconductors - A7630 Electron paramagnetic resonance and relaxation (condensed matter) - A7430G Superconductor response to electromagnetic fields - A7660 Nuclear magnetic resonance and relaxation (condensed matter)
Chemical indexing:Bi2Sr2CaCu2O8/ss Bi2/ss Cu2/ss Sr2/ss O8/ss Bi/ss Ca/ss Cu/ss Sr/ss O/ss;Nb-AlN-NbN/int AlN/int NbN/int Al/int Nb/int N/int AlN/bin NbN/bin Al/bin Nb/bin N/bin Nb/el
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