

324.

标题: Nonthermal response of YBa₂Cu₃O_{7-δ} thin films to picosecond THz pulses

作者: Probst, P (Probst, P.); Semenov, A (Semenov, A.); Ries, M (Ries, M.); Hoehl, A (Hoehl, A.); Rieger, P (Rieger, P.); Scheuring, A (Scheuring, A.); Judin, V (Judin, V.); Wunsch, S (Wuensch, S.); Il'in, K (Il'in, K.); Smale, N (Smale, N.); Mathis, YL (Mathis, Y. -L.); Muller, R (Mueller, R.); Ulm, G (Ulm, G.); Wustefeld, G (Wuestefeld, G.); Huebers, HW (Huebers, H. -W.); Hanisch, J (Haenisch, J.); Holzapfel, B (Holzapfel, B.); Siegel, M (Siegel, M.); Muller, AS (Mueller, A. -S.)

来源出版物: PHYSICAL REVIEW B 卷: 85 期: 17 文献号: 174511 DOI: 10.1103/PhysRevB.85.174511 出版年: MAY 11 2012

在 Web of Science 中的被引频次: 0

被引频次合计: 0

引用的参考文献数: 31

摘要: The photoresponse of YBa₂Cu₃O_{7-δ} thin film microbridges with thicknesses between 15 and 50 nm was studied in the optical and terahertz frequency range. The voltage transients in response to short radiation pulses were recorded in real time with a resolution of a few tens of picoseconds. The bridges were excited by either femtosecond pulses at a wavelength of 0.8 μm or broadband (0.1-1.5 THz) picosecond pulses of coherent synchrotron radiation. The transients in response to optical radiation are qualitatively well explained in the framework of the two-temperature model with a fast component in the picosecond range and a bolometric nanosecond component whose decay time depends on the film thickness. The transients in the THz regime showed no bolometric component and had amplitudes up to three orders of magnitude larger than the two-temperature model predicts. Additionally THz field-dependent transients in the absence of DC bias were observed. We attribute the response in the THz regime to a rearrangement of vortices caused by high-frequency currents.

入藏号: WOS:000303910400007

语种: English

文献类型: Article

KeyWords Plus: HOT-ELECTRON BOLOMETER; SUPERCONDUCTING FILMS; PHOTORESPONSE; RADIATION; NONEQUILIBRIUM; MICROBRIDGES

地址: [Probst, P.; Scheuring, A.; Wuensch, S.; Il'in, K.; Siegel, M.] KIT, Inst Mikro & Nanoelektron Syst, D-76187 Karlsruhe, Germany

[Probst, P.; Huebers, H. -W.] DLR eV German Aerosp Ctr, Inst Planetenforsch, D-12489 Berlin, Germany

[Ries, M.; Wustefeld, G.] HZB, D-12489 Berlin, Germany

[Hoehl, A.; Mueller, R.; Ulm, G.] PTB, D-10587 Berlin, Germany

[Rieger, P.; Smale, N.; Mathis, Y. -L.] ISS, KIT, Eggenstein Leopoldshafen, Germany

[Judin, V.; Mueller, A. -S.] KIT, Lab Applikationen Synchrotronstrahlung, D-76131 Karlsruhe, Germany

[Huebers, H. -W.] Tech Univ Berlin, Inst Opt & Atomare Phys, D-10623 Berlin, Germany

[Haenisch, J.] IFW Dresden, Leibniz Inst Festkorper & Werkstofforsch Dresden, D-01069 Dresden, Germany

通讯作者地址: Probst, P (通讯作者),KIT, Inst Mikro & Nanoelektron Syst, Hertzstr 16, D-76187 Karlsruhe, Germany

电子邮件地址: petra.probst@kit.edu

出版商: AMER PHYSICAL SOC

出版商地址: ONE PHYSICS ELLIPSE, COLLEGE PK, MD 20740-3844 USA

Web of Science 分类: Physics, Condensed Matter

学科类别: Physics

IDS 号: 940RJ

ISSN: 1098-0121

29 字符的来源出版物名称缩写: PHYS REV B

ISO 来源出版物缩写: Phys. Rev. B

来源出版物页码计数: 8