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Title:Performance of the continuous-wave imaging system based on a terahertz gas laser Authors:Wang, Ying-Xin (1); Zhao, Zi-Ran (2); Chen, Zhi-Qiang (2); Zhang, Li (2); Kang, Ke-Jun (2); Deng, Jing-Kang (1)

Author affiliation:(1) Department of Physics, Tsinghua University, Beijing 100084, China; (2) Key Laboratory of Particle and Radiation Imaging, Ministry of Education, Department of Engineering Physics, Tsinghua University, Beijing 100084, China

Corresponding author: Wang, Y.-X. (wangyingxin2000@tsinghua.org.cn)

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Abstract:Continuous-wave terahertz imaging was demonstrated based on an optically-pumped far-infrared gas laser and a Golay cell detector. The imaging system design and construction are discussed in the context of the choice and configuration of the involved terahertz optical components and devices. Performance characteristics of the system, including signal-to-noise ratio, spatial resolution, detector response and imaging speed were measured and analyzed in detail. With this system, terahertz transmission images of various samples were obtained, confirming the quality of our setup and supporting the feasibility of terahertz imaging technique for applications in security screening and quality control. A data processing method for automatic calibration of the image intensities in the background region was also proposed to remove the influence of laser power drift on the image quality.

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