A New Laser Micromachining System for the Fabrication of THz Waveguide and Quasi-Optical Components

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Abstract

Laser micromachining techniques can be used to fabricate high-quality waveguide and quasi-optical components to micrometer accuracies. Successful waveguide designs can be directly scaled to THz frequencies. This technology holds much promise and may permit the construction of the first fully-integrated THz heterodyne imaging arrays. At the University of Arizona, we will soon complete the construction of a laser micromachining system specifically designed for fabricating THz waveguide and quasi-optical structures. Once operational, we plan to use the system to construct prototype THz 1x4 focal plane mixer arrays, AR coated silicon lenses, THz LO sources, and phase gratings. The system can be used to micromachine structures up to 6 inches across. In the paper we will discuss the design and performance of the laser micromachining system, how it compares to other micromachining technologies, and illustrate the type and range of components this exciting new technology will make accessible to the THz community.