

PRELIMINARY STUDY ON THZ CONFOCAL IMAGING

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1. INTRODUCTION AND BACKGROUND

THz radiation is the electromagnetic radiation from 0.1 to 10 THz. It has many unique advantages such as high penetration to materials that are opaque to visible light, and has no harmful ionization to human beings. So THz imaging is a promising technique which has wide application prospects in security and quality control. With the development of THz technology, many ideas have been introduced from other well developed fields to improve the THz imaging quality, and THz confocal imaging is one of the researching directions. In this paper, principle of confocal microscope was employed in a THz imaging system and improvement of the image quality was observed.

2. EXPERIMENTAL SETUP AND RESULTS

FIR gas laser SIFIR-50 FPL from Coherent Inc. was utilized as the illuminating source, and the system was operating at 2.52 THz (118.83 μm). P4-42 detector was used to detect the THz radiation. It is a pyroelectric detector working at room temperature, and the high sensitivity makes it possible to detect weak radiation after the insertion of small apertures. Our preliminary interest focused on the improvement of the lateral resolution, and imaging result of a metal sheet was shown in Figure 1. The scanning step length is 0.2 mm with 0.5 s' delay. The result shows improvement of both lateral resolution and image contrast by the insertion of two confocal apertures.

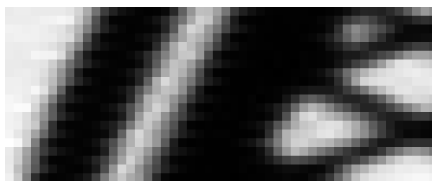


Figure 1: Confocal imaging result of a metal sheet

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