Multi-Spectral and THz-TDS Imaging of Tanda Painting

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Abstract—We systematically examined the mid-20th century Italian painting "After Fishing" (fig. 1) by Ausonio Tanda using multi-spectral (UV, RGB visible, tri-band IR), x-ray and terahertz time-domain spectroscopic imaging. THz-TDSI was performed in both transmission and reflection geometries and the results were compared.

I. INTRODUCTION

We systematically examined the mid-20th century Italian painting "After Fishing" (fig. 1) by Ausonio Tanda using multi-spectral (UV, RGB visible, tri-band IR), x-ray and terahertz time-domain spectroscopic imaging. THz-TDSI was performed in both transmission and reflection geometries and the results were compared.

II. Results

In transmission, qualitative comparisons were made between the x-ray density image (fig. 2a) and THz images calculated using the time-domain peak analysis—including maximum, minimum and peak-to-peak amplitude (fig. 2b), and pulse power integration—and frequency domain analysis (fig. 2c) between 0.1 and 0.7 THz. Many features appeared in both the x-ray and THz images, with varying quality.

The availability of the spectral reflectance of the whole examined artwork, pixel by pixel, allows us to make comparisons between all the pixels of the image to determine the multi-variant spectral similarity with respect to a fixed pixel. Figure 4a shows the spectral reflectance, using all seven components, of regions with least spectral similarity as blue and greatest similarity as red; while figure 4b includes the x-ray density component. The THz data will eventually be combined with these 8 components for further quantitative analysis.

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References