

Frequency modulated continuous wave imaging for art painting defect analysis

J.P. Guillet ¹, M. Roux ², K. Wang ³, X. Ma^{1,3}, F. Fauquet ¹, F. Darracq ¹ and P. Mounaix ¹

Contact : jean-paul.guillet@u-bordeaux.fr

¹ Bordeaux University, IMS, UMR CNRS 5218, 351 cours de la libération 33405 Talence, France

² L'atelier des renaissances, 1 allée de Gieu, 33650 Saucats, France

³ Wuhan National Laboratory for Optoelectronics, School of Optoelectronic Science and Engineering, Huazhong University of Science and Technology, Wuhan 430074, China

Terahertz non-destructive testing is a well-known technique for analysis of art painting. Several works have shown detection of hidden layers and defects with terahertz pulses [1,2]. In a previous work, we have shown that terahertz radiation can detect defects in the context of a restoration of a painting [4,5] with a speed increase compared to time domain imaging, which implies the ability to scan an entire painting. Our system, working in transmission and reflection imaging at 100 GHz and 300 GHz was able to detect voids between painting and canvas and underlining glue discontinuities. Then, the painting was restored (cleaning and removing varnish first) and we add a fixative layer and a gluing of the pictorial layer on the canvas using historical methods and process. For this, we made an injection of rabbit skin glue inside the zones of air bubbles to join the both canvas together. This technique of restoration allows to repair locally the painting avoiding a total relining. We will demonstrate (on Fig 1) that voids have been filled and no longer appears on the image made after restoration and that millimeter wave imaging is an efficient tool for art science and restoration.

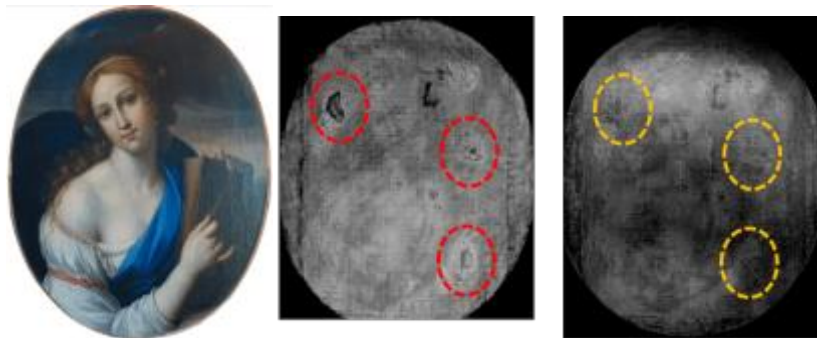


Fig.1. Left : Photography of painting. Center: 300GHz reflection image of the painting before restoration. The red surrounded areas are air voids between the pictorial layer and the canvas. Right: 300GHz reflection image of the painting after first step of restoration. The yellow surrounded areas have been restored

References

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