IMAGING AND SPECTRAL INFORMATION WITH TIME-DOMAIN OCT

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Paintings are stratified systems made of a ground layer covered by one or more coloured layers. The composition and the thickness of each layer is of great interest for conservation, restoration and art history. Until now, these are obtained by electronic microscopy after sampling. In order to carry out a non-destructive technique without contact, we develop a time-domain Optical Coherence Tomography (OCT) in the visible range which combines tomographic imaging and Fourier transform spectroscopy.

OCT is an optical device developed since the 90's. It allows to obtain three-dimensional images in the near infrared domain at different depths on biological tissues.[1] More recently OCT is applied to works of art to observe and to measure the thickness of varnishes and of paint layers.[2-3] The present device extends the previous results to the visible range. It provides imaging with a resolution about 2 µm in the three directions.[4] Imaging is realised on several samples to determine the field of application and its limits (pigment volumic concentration, thickness). Works of art will be studied such as paintings, music instruments and glasses.

Moreover, with an appropriate signal processing based on Fourier transform, it is then possible to calculate spectral information. The spectra obtained for dyes are validated by comparison with spectroscopic measurements. First results obtained on scattering media like pictorial layers containing pigments will then be presented.

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