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# Laser holographic imaging of the human retina

Olivier Martinache\*<sup>1</sup>, Zofia Bratasz\*<sup>1</sup>, Yohan Blazy\*<sup>1</sup>, Michael Atlan<sup>1</sup>, Julia Sverdlin<sup>1</sup>,  
Kate Grieve<sup>2</sup>, and Michel Paques<sup>2</sup>

<sup>1</sup>Institut Langevin – ESPCI Paris - PSL Research University - CNRS - Institut Langevin – France

<sup>2</sup>CHNO des Quinze-Vingts – Centre Hospitalier National d’Ophtalmologie des Quinze-Vingts – France

## Abstract

The eye offers a unique opportunity for the non-invasive exploration of cardiovascular diseases. Optical angiography in the retina requires sensitive measurements, which hinders conventional full-field laser Doppler imaging schemes. To overcome this limitation, we used digital holography to perform laser Doppler perfusion imaging of human retina with near-infrared light. Two imaging channels with a slow and a fast CMOS camera were used simultaneously for real-time narrowband measurements, and offline wideband measurements, respectively. The beat frequency spectrum of optical interferograms recorded with the fast (up to 75 kHz) CMOS camera was analyzed by short-time Fourier transformation. Power Doppler images drawn from the Doppler power spectrum density qualitatively revealed blood flow in retinal vessels over 512x512 pixels covering 2.4x2.4 mm<sup>2</sup> on the retina with a temporal resolution down to 1,6 ms.

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\*Speaker