Abstract Submitted
for the DFD05 Meeting of
The American Physical Society

Noninvasive Visualization of Human Capillary Vessel Blood Flow[1] MASAO WATANABE, TOSHIYUKI SANADA, YOSHINORI SAWAE, MASUTAKA FURUE, Kyushu University — Human blood flows are highly susceptible to physical and health conditions. Hence quantitative evaluation of Blood flow is a useful parameter in the physical check up of individuals. However, the most convenient method is taking a blood sample, which can only examine ex vivo Blood condition. We turn our attention to the observation of the capillary loops of blood vessels in the finger skin nail fold, in which blood flow can be easily visualized without using complicated specialized tools other than capillaroscopy. We modified both the spatial and temporal resolution in capillaroscopy. A deep-focus high magnification zoom lens and a high speed video camera of 1000 fps allowed us to observe the motion of red blood cells, white blood cells and plasmas. Quantitative analysis of blood flow allowed us to observe the motion of red blood cells in capillary vessels with a diameter of about 10 micro meters. We discuss the quantitative evaluation of blood flow velocity in artery capillary vessels. We also conducted shape analysis of the capillary vessel, by using the level set method. By analyzing the obtained level set function, quantitative evaluation of the capillary blood shape, such as characteristic diameters and curvatures, are carried out.

[1]Supported by JSPS, Grant No.17656068

Toshiyuki Sanada
Kyushu University

Date submitted: 03 Aug 2005 Electronic form version 1.4