

Laser Doppler Flowmetry
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February 14th, 2005
Biomedical Engineering Seminar
ELE 282

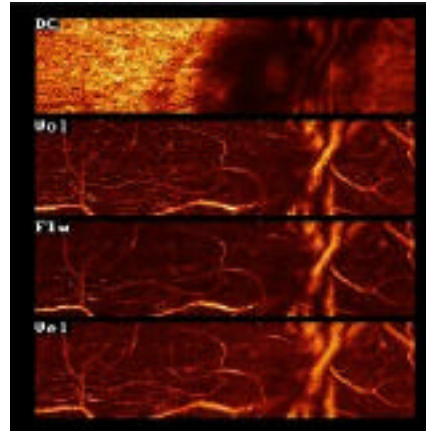
Over the years, many people have experienced ocular problems, such as Glaucoma or Macular Degeneration. These vision impairments have been capers that haunt patients that have such conditions. Laser Doppler Flowmetry is a method for calculating circulation on a microscopic level in a patient's eye. This process is used to determine if these degenerative illnesses are present. The eye circulation in an affected eye is always considerably different than that of a healthy eye.



(A Laser Doppler Flowmeter)

A Laser Doppler Flowmeter (LDF) works by manipulating the optical Doppler effect. The LDF illuminates a retinal vessel with a monochromatic light emitted from a low power laser. Some of the light is deflected by the movement of red blood cells through the retinal vessels, as a result producing a Doppler frequency shift. The LDF reads the frequency of the oscillation produced by the Doppler frequency shift of the red blood cells in the retinal vessels and translates the frequency to an

intensity oscillation with a typical frequency in the range of kHz, therefore making the result measurable.



(Figure illustrates Perfusion maps obtained from the optic nerve head and the temporal retina of a normal eye. Images from top to bottom are the reflectance image, volume map, flow map, and velocity map)

The apparatus can penetrate 1-4mm of non-pigmented tissue and the light emitted and reflected is fed through optical fibers from the retinal vessel to the analyzer-recorder. The output of the LDF is the flux of red blood cells, simply defined as the number of red blood cells times their velocity, which determines circulation.

The LDF is only produced by a few companies, notably, Schepens Retina Associates (created in 1990's) and Transonic Systems Inc.

<http://www.heidelbergengineering.com/docs/hrf-tutorial.pdf>
<http://www.vet.utk.edu/research/doppler.shtml>
[http://tnweb.tn.utwente.nl/bit/research/bmo/applications/The mel-bloodflow perfusion/NovelInstrumentsLD\(alexander\)/general.htm](http://tnweb.tn.utwente.nl/bit/research/bmo/applications/The%20mel-bloodflow%20perfusion/NovelInstrumentsLD(alexander)/general.htm)
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