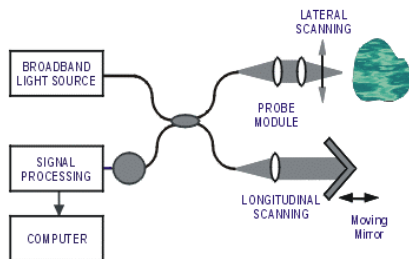


## Optical Coherence Tomography

Optical Coherence Tomography (OCT) is a new class of diagnostic medical imaging technology that utilizes advanced photonics and fiber optics to obtain images and tissue characterization on a scale never before possible within the human body.

The images produced by OCT are much more detailed than those obtained by other methods such as ultrasound because OCT uses infrared light waves which reflect off the internal micro structures in the tissues as opposed to the rough images produced by the sound 'echoes' of an ultrasound machine. In addition, the frequencies and bandwidths of infrared light are orders of magnitude higher than ultrasound signals, which allow for greatly increased image resolution

Its flexibility is what makes OCT a most attractive technology. It is implemented by infrared light that is transported to the imaging site by an optical fiber that is .006(in) in diameter. This design makes it very easy to integrate in different existing imaging catheters and other devices of the sorts. Also, because it can be performed over approximately the same distance as a biopsy at high resolution, some of the most attractive applications for OCT consist of those where common biopsies cannot be performed or are ineffective.



To extract the reflected optical signals from the infrared light, the OCT uses Interferometry. "Interferometry is the science of combining or interfering two or more waves, which creates an output wave that quantitatively defines the difference in the phase and the amplitude of the input waves; this in turn can be used to explore the nature of the input waves" (wikipedia). The output, measured by an interferometer, is probably the computer to produce high-resolution, cross sectional or 3-dimensional images of the tissue. The resolution is so good that it diminishes the need for processing real samples of tissue for diagnosing.

The future of this technology includes diagnosing for cancer and heart disease. OCT ca potentially aid in cardiovascular treatments such as angioplasty because of its abilities to provide accurate imaging of the arteries being operated on. In addition it would aid in cancer treatment by earlier detection and lowering the number of biopsies done to target the cancerous cells. This ability to view the inner body tissues with out excision opens up many possibilities and treatments to the medical world.

Sources:

<http://www.ncrr.nih.gov/biotech/2006PIAagenda.pdf>

<http://www.lightlabimaging.com/oct.html>

<http://www.medcompare.com/spotlight.asp?spotlightid=53>