

ACOUSTICS2008/3509 photoacoustic cancer imaging

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Photoacoustics, or optoacoustics, involves ultrasound imaging based on ultrasound generated by absorption of light by tissue chromophores such as blood and melanin. Ultrasound is generated when pulsed or intensity modulated light is used which locally deposits a sufficient amount of energy in a sufficiently short time to cause an efficient generation of internal stress in the tissue. When this stress relaxes, an ultrasound wave is emitted which can be detected at the surface of the tissue. On the basis of these ultrasound waves, a three-dimensional image the internal distribution of absorption can be constructed. We will discuss various technical implementations of the technique, and will illustrate various medical applications. A particularly important application field is oncology: in cancer, the presence of blood vessels is essential for the tumor to grow and spread. We will show results of photoacoustic imaging performed on small animals with implanted tumors. It appears, that measurement speed is a key issue in obtaining images with sufficient quality. Furthermore, we will show results obtained with our photoacoustic mammoscope on patients with breast cancer.