

عنوان مقاله:

Towards Measurement of Polarization Properties of Skin using the Ellipsometry Technique

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خلاصه مقاله:

Introduction: The human skin is an active medium from the optical point of view. Therefore, the diagnostic and therapeutic techniques employing light are increasing. Current optical techniques are based on the measurement of the intensity of reflected absorbed or backscattered light from or within skin. Studies have shown that biological tissues, and in particular skin, demonstrate polarization properties. Scattering of light from the surface of skin or the layers within it is a function of incident polarization. Therefore, by changing the polarization of the incident light and measuring the backscattered light, we can study those skin properties which affect the state of polarization. **Material and methods:** We have implemented a scattering ellipsometry system in order to investigate the polarization properties of a phantom representing skin. Using the Stocks vector defining the state of polarization and measuring the elements of the Mueller matrix representing the phantom under study, we have shown that by changing the reflection and scattering properties of the sample, polarization characteristics of the backscattered light will be affected. **Results:** The results of this investigation showed that some elements of the Mueller matrix of the phantom under study were affected by the polarization state of the incident light and the scattering component within the phantom. Therefore, these elements have the potential of being used as polarization markers of the biological tissue. **Discussion and conclusion:** Upon interaction of polarized light with the skin tissue, the backscattered light will contain optical and polarization information about the skin. Using a simple laboratory-made phantom, we have shown that by analyzing the polarization information within the backscattered light we can study the cause, and possibly the disease, which affected the polarization characteristics of the skin.

کلمات کلیدی:

Polarization, Skin Phantom, Scattering Ellipsometry, Stocks Vector, Mueller Matrix

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