

Spatially-Resolved Diffuse Reflectance for Optical Properties Estimation

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Despite advances in using optical techniques in life sciences, light-biological tissue interactions must be well-known for the tissues and regions to be treated or diagnosed for a broad development of this field. In this sense, the physical phenomena that govern these interactions are well-established and can be studied both analytically (e.g. with the diffusion approximation) and statistically (with Monte Carlo of the radiative transport equation). However, these equations and models, which describe how light propagates in tissues, can only be solved if we have the optical properties of these tissues, such as the absorption (μ_a) and scattering (μ_s) coefficients. Thus, the estimation of the optical parameters of biological content is of great importance, both to the development of diagnosis models and in the design of therapeutic approaches. This work reports the development of a spatially-resolved diffuse reflectance system to estimate the optical properties of biological tissues using an optical fiber point probe. The system was designed to perform measurements in a clinical environment from the skin surface.

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