

# Abstract

We have developed a Monte Carlo algorithm that computes all 16 two-dimensional elements of the diffuse backscattering Mueller Matrix for scattering media. Using the Stokes Mueller formalism and scattering amplitudes, we are able to consider polarization dependent photon propagation in scattering media, including linearly and circularly polarized light. The two dimensional surface intensity patterns can be used to differentiate the dense media such as polystyrene sphere and water vapour molecules. Introducing the Mueller Matrix concept for diffusely backscattered light, a framework is provided to select a subset of measurements that comprehensively describe the optical properties of back scattering media.