

DERIVATION OF AN EQUIVALENT MUELLER MATRIX ASSOCIATED TO AN ABSORBING, EMITTING AND MULTIPLY SCATTERING PLANE MEDIUM

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ABSTRACT. Measurements of scattering matrix of particles in a medium are likely to provide sufficient information on size, structure and optical properties of particles through the confrontation with appropriate and accurate theoretical models. To allow direct comparison with measurements, when the semi-transparent medium is not optically thin, non homogeneous, absorbing, emitting and multiply scattering, the whole system may be modelled as a single optical device and an equivalent Mueller matrix may be derived. This is performed in the case of a plane parallel semi-transparent medium containing randomly-oriented symmetric particles. The transfer of polarized light is solved by using the Vector Discrete Ordinates Method (VDOM). The Mueller matrix elements are obtained as functions of directions of transmitted or reflected radiation from the simulation of four virtual experiments. The effects of temperature and radiative properties on the Mueller matrix are investigated through the comparison of its elements with those of the scattering matrix of particles.