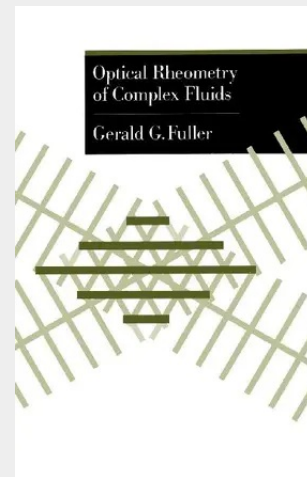


Optical Rheometry of Complex Fluids

This book provides a self-contained presentation of optical methods used to measure the structure and dynamics of complex fluids subject to the influence of external fields. Such fields (hydrodynamic, electric and magnetic) are commonly encountered in both academic and industrial research, and can produce profound changes in the microscale properties of liquids comprised of polymers, colloids, liquid crystals or surfactants. Starting with the basic Maxwell field equations, this book and Mueller calculus, and then covers the transmission, reflection and scattering of light in anisotropic materials. Spectroscopic interactions with orientated systems such as absorptive dichroism, small wide angle light scattering, and Raman scattering are discussed. Applications of these methods to a wide range of problems in complex fluid dynamics and structure are presented, along with selected case studies on particular studies chosen to elucidate the range of techniques and materials that can be studied.

This book provides a self-contained presentation of the optical methods used to measure the structure and dynamics of complex fluids that are subject to the influence of external fields. Starting with the basic Maxwell field equations, this book discusses the polarization properties of light, including Jones and Mueller calculus, and then covers the transmission, reflection, and scattering of light in anisotropic materials. Spectroscopic interactions with oriented systems such as absorptive dichroism and Raman scattering are discussed, along with small and wide angle light scattering performed in the presence of external fields. Applications of these methods to a wide range of problems in complex fluid dynamics and structure are presented, with selected case studies chosen to elucidate the range of techniques and materials that can be studied. As the only book of its kind to offer a self-contained description of optical methods used for the full range of complex fluids, this work will be of special interest to a wide range of readers, including chemical engineers, physical chemists, physicists, polymer and colloid scientists, along with graduate and post-graduate researchers.



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