Volume and Interface Studies of Complex Liquid Media
Meyer, W.V.

Citation for published version (APA):

General rights
It is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), other than for strictly personal, individual use, unless the work is under an open content license (like Creative Commons).

Disclaimer/Complaints regulations
If you believe that digital publication of certain material infringes any of your rights or (privacy) interests, please let the Library know, stating your reasons. In case of a legitimate complaint, the Library will make the material inaccessible and/or remove it from the website. Please Ask the Library: http://uba.uva.nl/en/contact, or a letter to: Library of the University of Amsterdam, Secretariat, Singel 425, 1012 WP Amsterdam, The Netherlands. You will be contacted as soon as possible.
**Introduction**

**SINGLE-BEAM MULTIPLE SCATTERING SUPPRESSION BY CROSS-CORRELATION IN VOLUME LIGHT SCATTERING**

In Section I our new method for characterizing particles in turbid media by cross-correlating the scattered intensity fluctuations at two nearby points (perpendicular to the scattering plane) in the far field is described. The cross-correlation function selectively emphasizes single scattering over multiple scattering. The usual dynamic light scattering capability of inferring particle size from decay rate is thus extended to samples which are so turbid as to be visually opaque. The method relies on single-scattering speckle being physically larger than multiple scattering speckle. With a suitable optical geometry to select nearby points in the far field or equivalently slightly different scattering wave vectors (of the same magnitude), the multiple scattering contribution to the cross-correlation function may be reduced and in some cases rendered insignificant. The viability of this technique has been confirmed at NASA and the University of Amsterdam (UvA), and recently combined with small angle X-ray scattering and dynamic X-ray scattering (Riese *et al.* [7] at UvA), allowing the measurement of hydrodynamic interactions.

**ADVANCES IN SURFACE LIGHT SCATTERING SPECTROSCOPY INSTRUMENTATION AND ANALYSIS FOR NON-INVASIVELY MEASURING SURFACE TENSION, VISCOSITY, AND OTHER INTERFACIAL PARAMETERS IN LIGHT SCATTERING SPECTROSCOPY**

In Section II our new generation of vibration mitigating surface light scattering spectroscopy instrumentation is described. The computational application of an instrument function derived using Fourier optics is presented. We derived the necessary surface response function algorithms to study both simple fluids, and binary fluids at their wetting transition and near their critical points. This instrument and its accompanying suite of analysis software allow us to easily make accurate and non-invasive measurements of the interfacial tension, volume viscosity, and other interfacial parameters of fluids. These developments can be applied to study systems with liquid–vapor and liquid–liquid interfaces, including spreading monolayers whenever optical access for a laser beam is available. Theoretical and experimental results are provided for both simple fluids and asymmetric thin films.

_Count them photons he said with a wave._ – *X. Druid*