

<http://arxiv.org/abs/0807.4705>

Quantitative imaging of colloidal flows

Authors: [Lucio Isa](#), [Rut Besseling](#), [Eric R. Weeks](#), [Wilson C. K. Poon](#)

(Submitted on 29 Jul 2008)

Abstract: We present recent advances in the instrumentation and analysis methods for quantitative imaging of concentrated colloidal suspensions under flow. After a brief review of colloidal imaging, we describe various flow geometries for two and three-dimensional (3D) imaging, including a 'confocal rheoscope'. This latter combination of a confocal microscope and a rheometer permits simultaneous characterization of rheological response and 3D microstructural imaging. The main part of the paper discusses in detail how to identify and track particles from confocal images taken during flow. After analyzing the performance of the most commonly used colloid tracking algorithm by Crocker and Grier extended to flowing systems, we propose two new algorithms for reliable particle tracking in non-uniform flows to the level of accuracy already available for quiescent systems. We illustrate the methods by applying it to data collected from colloidal flows in three different geometries (channel flow, parallel plate shear and cone-plate rheometry).

Comments: 21 pages, 24 figures

Subjects: Soft Condensed Matter (cond-mat.soft); Materials Science (cond-mat.mtrl-sci)

Cite as: [arXiv:0807.4705v1](#) [cond-mat.soft]

Submission history

From: R. Besseling [[view email](#)]

[v1] Tue, 29 Jul 2008 17:18:33 GMT (909kb)