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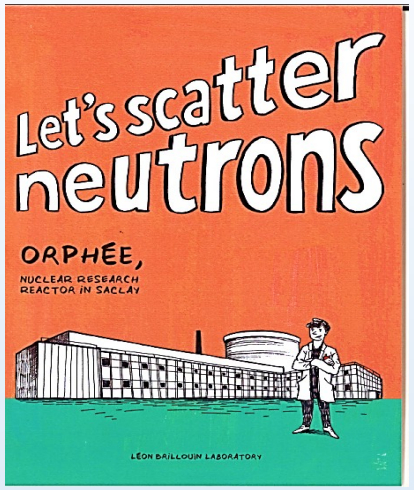
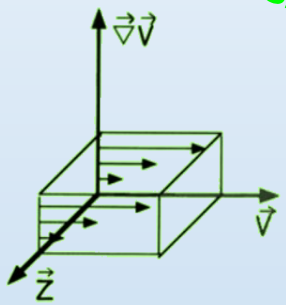


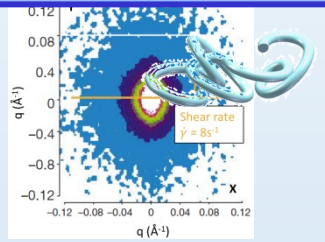
Becoming a Large Facilities User
by looking at molecular structure under flow

Laboratoire Léon Brillouin https://www-llb.cea.fr/

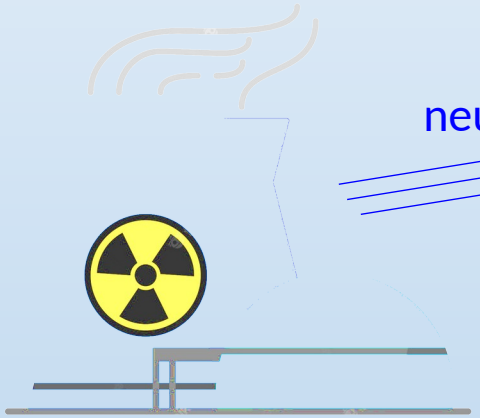
Contact: laurence Noirez@cea.fr

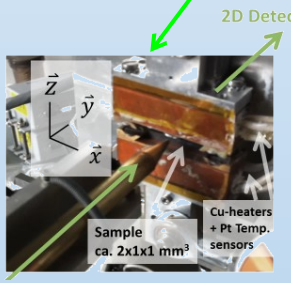
Neutron shear cells





Narrow gap 4-cylinders Couette e=0.1mm





Low frequency set-up
P. Kahl et al 2016

P. Baroni et al, Rev. Scie. Instr. ***174*** *(2001)*
C. Pujolle, L. Noirez, Nature (2001)
L. Noirez et al, Macromol. Rapid. Comm. 2009

Access program to Large Facilities
via a LLB local contact
and Phoenix submission :
https://phoenix.cea.fr.

phoenix

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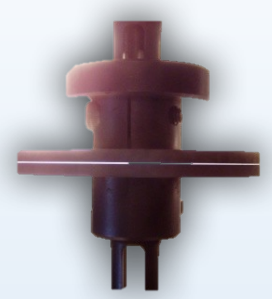
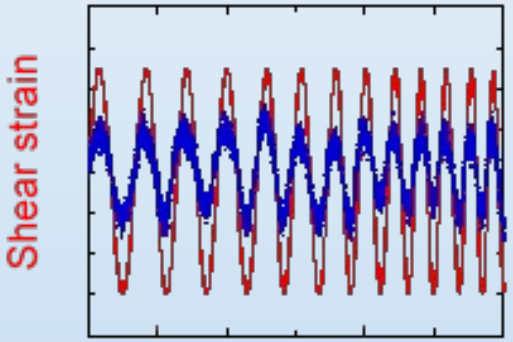
ÖSTERREICHISCHE GESELLSCHAFT FÜR RHEOLOGIE

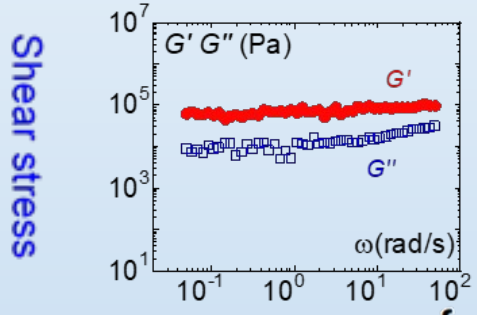
Accessing Liquid Shear Elasticity using full Wetting Rheology

Laboratoire Léon Brillouin https://www-llb.cea.fr/
Contact: laurence Noirez@cea.fr

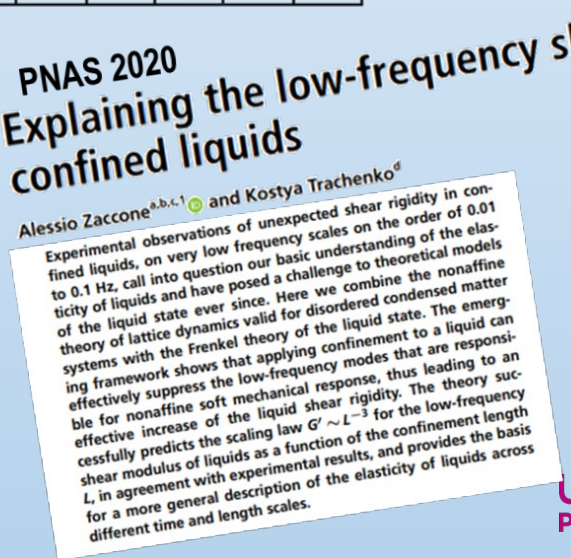


We claim: The NO-slip boundary condition is generally not fullfilled
Full wetting conditions improve the measure and reveal the elastic response of liquids



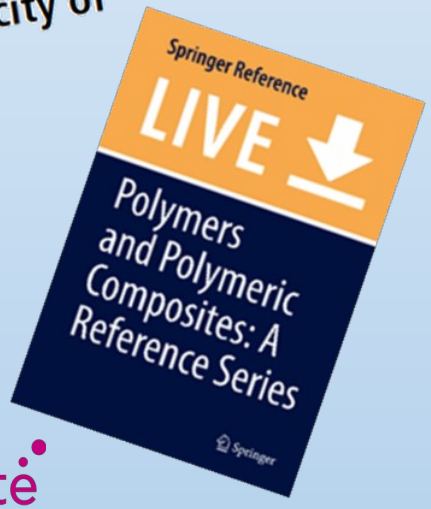


Low frequency elastic response of a low molecular weight polymer at T= Tg +100°C
Patent FR052379 - PCT
DATA: ARES 2, TA-Instruments


PNAS 2020
Explaining the low-frequency shear elasticity of confined liquids

Alessio Zaccone[a,b,c,1] and Kostya Trachenko[d]

Experimental observations of unexpected shear rigidity in confined liquids, on very low frequency scales on the order of 0.01 to 0.1 Hz, call into question our basic understanding of the elasticity of liquids and have posed a challenge to theoretical models of the liquid state ever since. Here we combine the nonaffine theory of lattice dynamics valid for disordered condensed matter systems with the Frenkel theory of the liquid state. The emerging framework shows that applying confinement to a liquid can effectively suppress the low-frequency modes that are responsible for nonaffine soft mechanical response, thus leading to an effective increase of the liquid shear rigidity. The theory successfully predicts the scaling law $G' \sim L^{-3}$ for the low-frequency shear modulus of liquids as a function of the confinement length L, in agreement with experimental results, and provides the basis for a more general description of the elasticity of liquids across different time and length scales.



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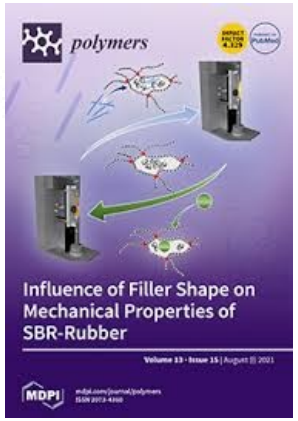

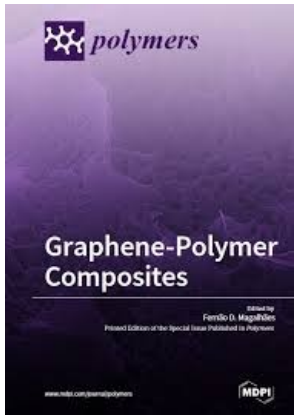

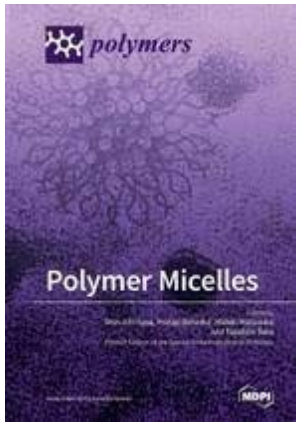

IMPACT FACTOR 4.967

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Dr. Laurence Noirez Website SciProfiles

Laboratoire Léon Brillouin (CEA-CNRS), University Paris-Saclay, CEA-Saclay, CEDEX, 91191 Gif-sur-Yvette, France

Interests: liquid state; multiscale properties (including microfluidics); micro-thermal analysis; liquid/solid interface; long range corrections; rheology; hydrodynamics; interfacial flow or energy

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