

Institut de Mécanique des Fluides

2 Allée du Pr Camille Soula, Toulouse

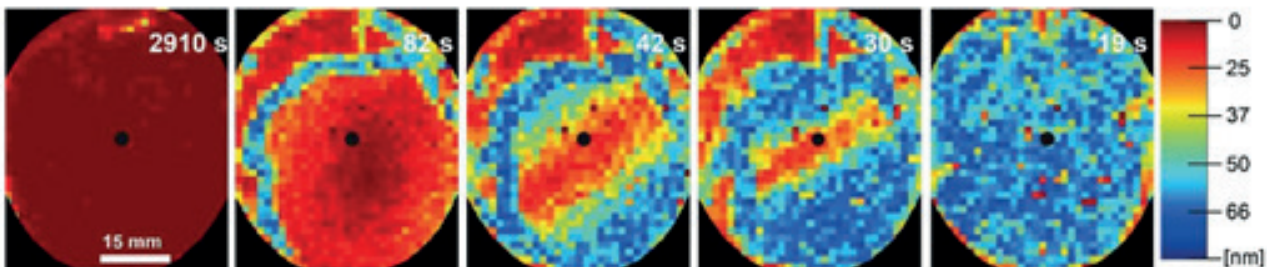
Vendredi 19 novembre à 10 h 30 - Amphithéâtre Nougaro

En live : <https://videos.imft.fr/live-event>

Macroscopic mechanical behavior and microscopic dynamics in network-forming systems

Luca Cipelletti

L2C UMR 5221 Université de Montpellier and CNRS, Montpellier - Institut Universitaire de France



Cartes de la dynamique locale sur 1 s pour un biopolymère sous contrainte, mesurées par diffusion dynamique de la lumière résolue dans le temps et dans l'espace. Libellés: temps avant la fracture macroscopique. D'après A. Pommella, L. Cipelletti, and L. Ramos, *Role of Normal Stress in the Creep Dynamics and Failure of a Biopolymer Gel*, Phys. Rev. Lett. **125**, 268006 (2020).

I'll describe recent experiments in our group where we couple rheology measurements to space and time-resolved dynamic light scattering, aiming at understanding the relationship between microscopic dynamics and linear and non-linear viscoelastic properties. I'll show that the microscopic dynamics is a very sensitive indicator of the ultimate fate of soft solids, able to detect precursors signs of failure well ahead other microscopic or macroscopic quantities [1,2]. I'll then focus on mucus gels, where an unexpected acceleration of the microscopic dynamics is seen upon applying a very modest shear strain, well within the rheological linear regime [3].

References

- [1] Aime, S., Ramos, L. & Cipelletti, L. Microscopic dynamics and failure precursors of a gel under mechanical load. PNAS **115**, 3587–3592 (2018).
- [2] A. Pommella, L. Cipelletti, L. Ramos, Role of normal stress in the creep dynamics and failure of a biopolymer gel, L., Phys. Rev. Lett. **125**, 268006 (2020).
- [3] D. Larobina, A. Pommella, A.-M. Philippe, M. Y. Nagazi, L. Cipelletti, Enhanced microscopic dynamics in mucus gels under a mechanical load in the linear regime, to appear in PNAS.

contact : sig_communication@imft.fr

Institut de Mécanique des Fluides - 2, Allée du Pr Camille Soula, 31400 Toulouse.

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