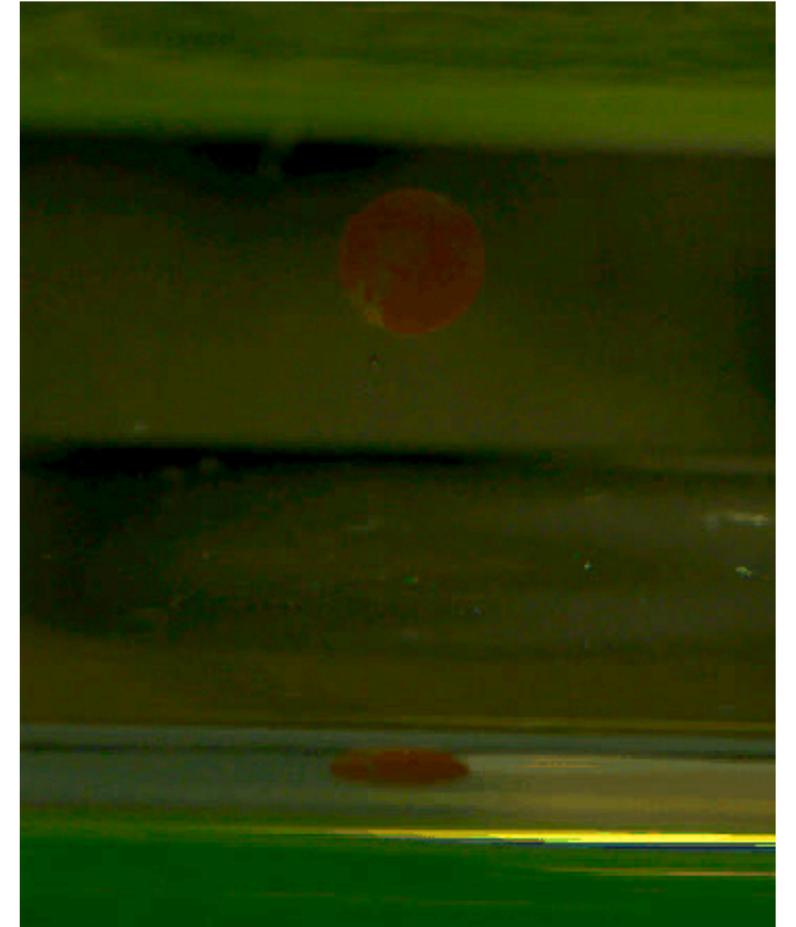


# SÉDIMENTATION D'UNE PARTICULE À PROXIMITÉ D'UNE INTERFACE LIQUIDE

*DELBOURG Antoine*

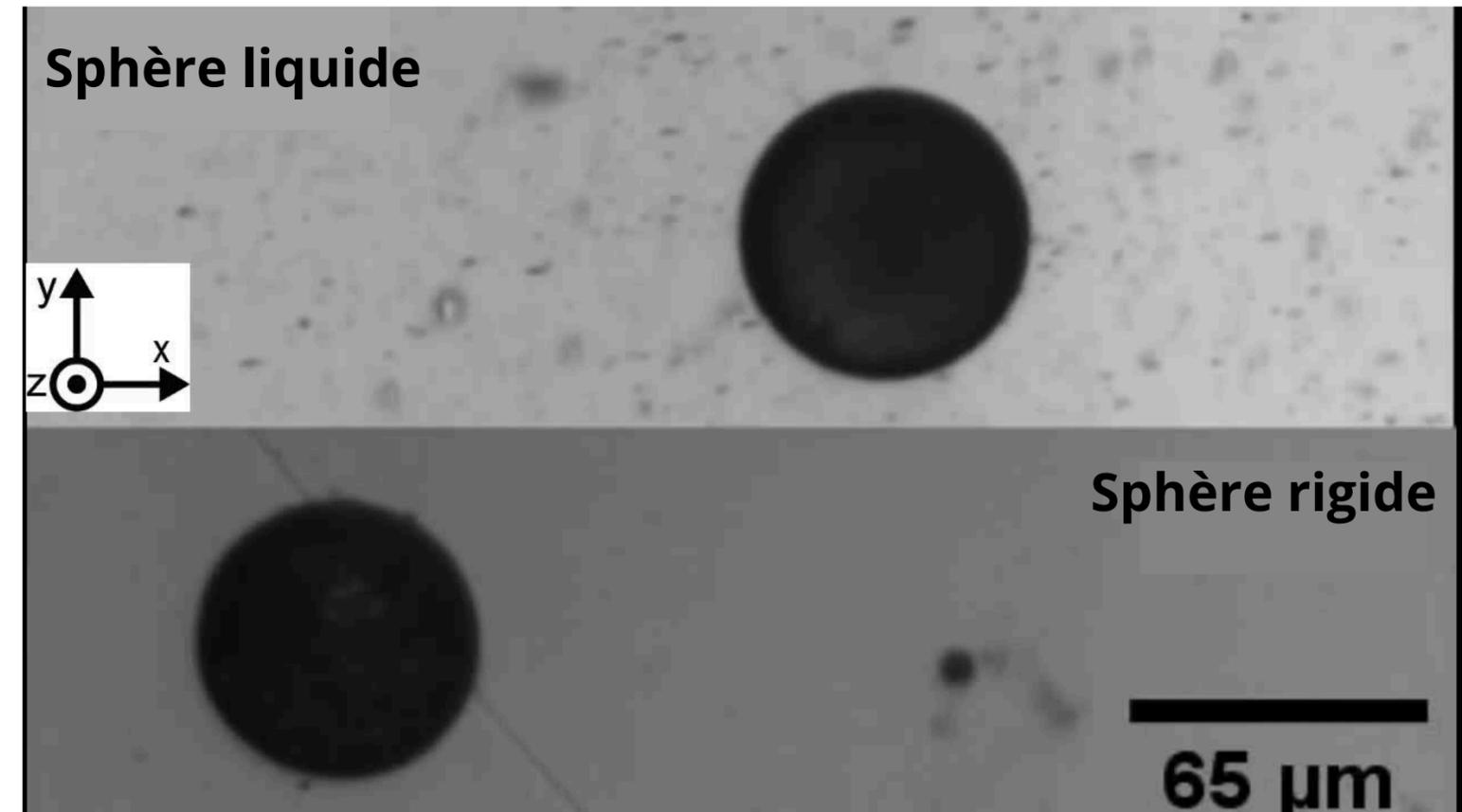
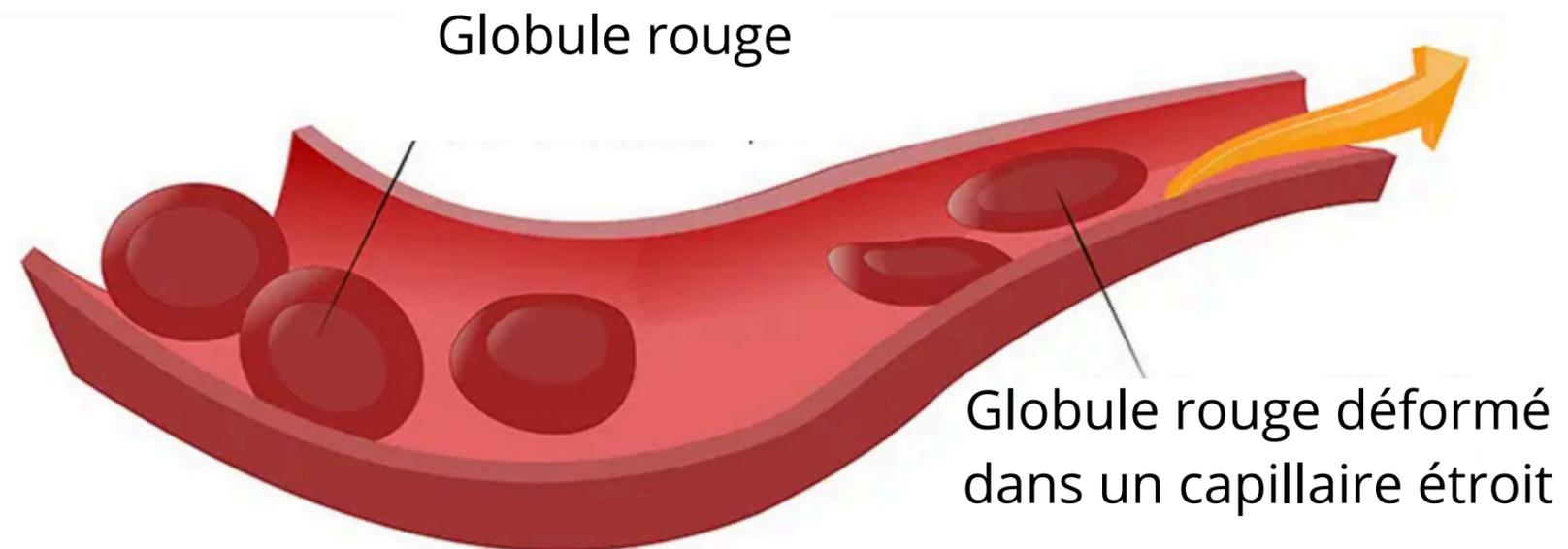
Encadrants : Gaëlle Audéoud, Yacine Amarouchene et Thomas Salez



Unité de formation  
Physique / université  
de BORDEAUX



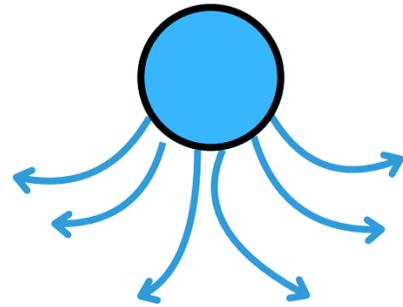
# INTRODUCTION



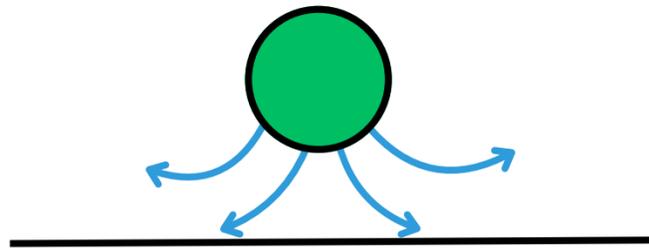
*Y.Gao et al. Science advances, 2023*

# INTRODUCTION

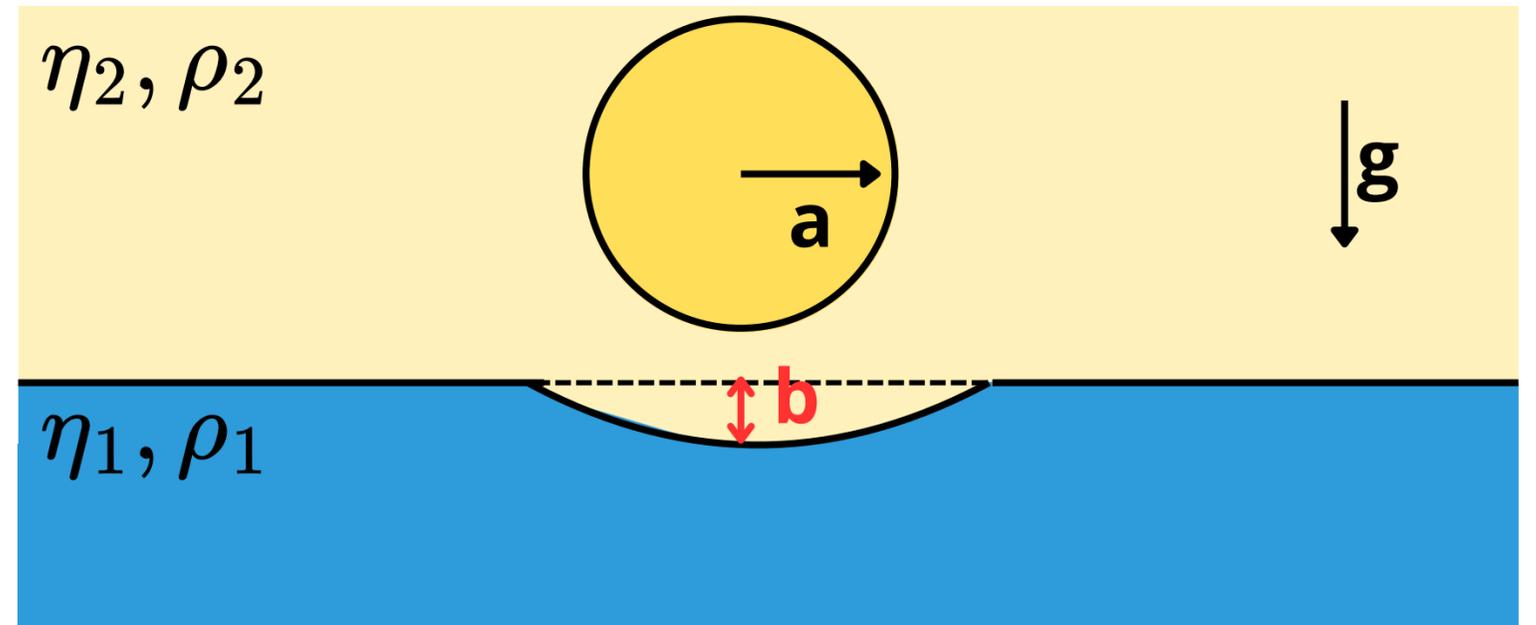
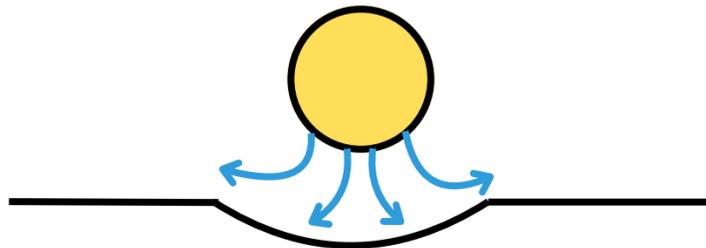
Cas volume ( $\emptyset$  interface)



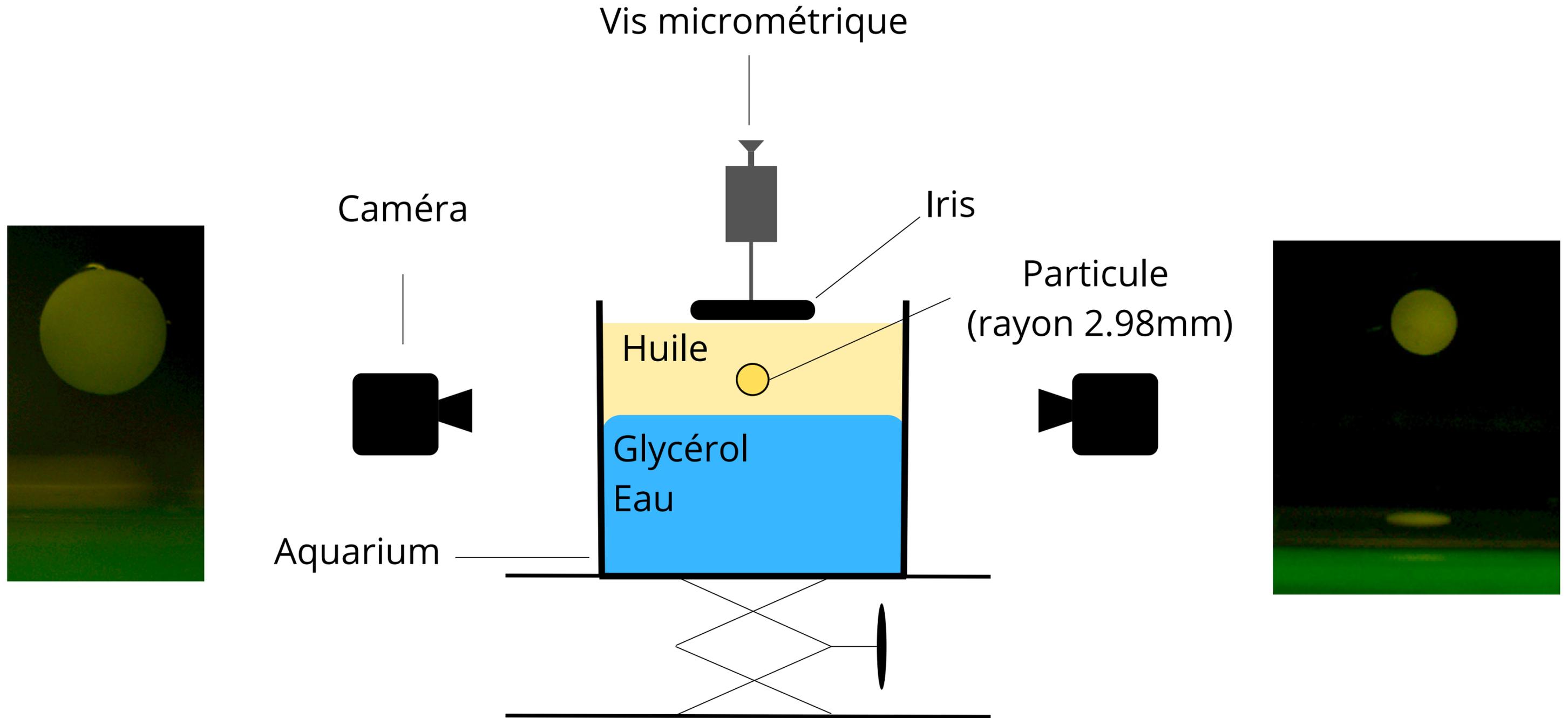
Cas interface solide



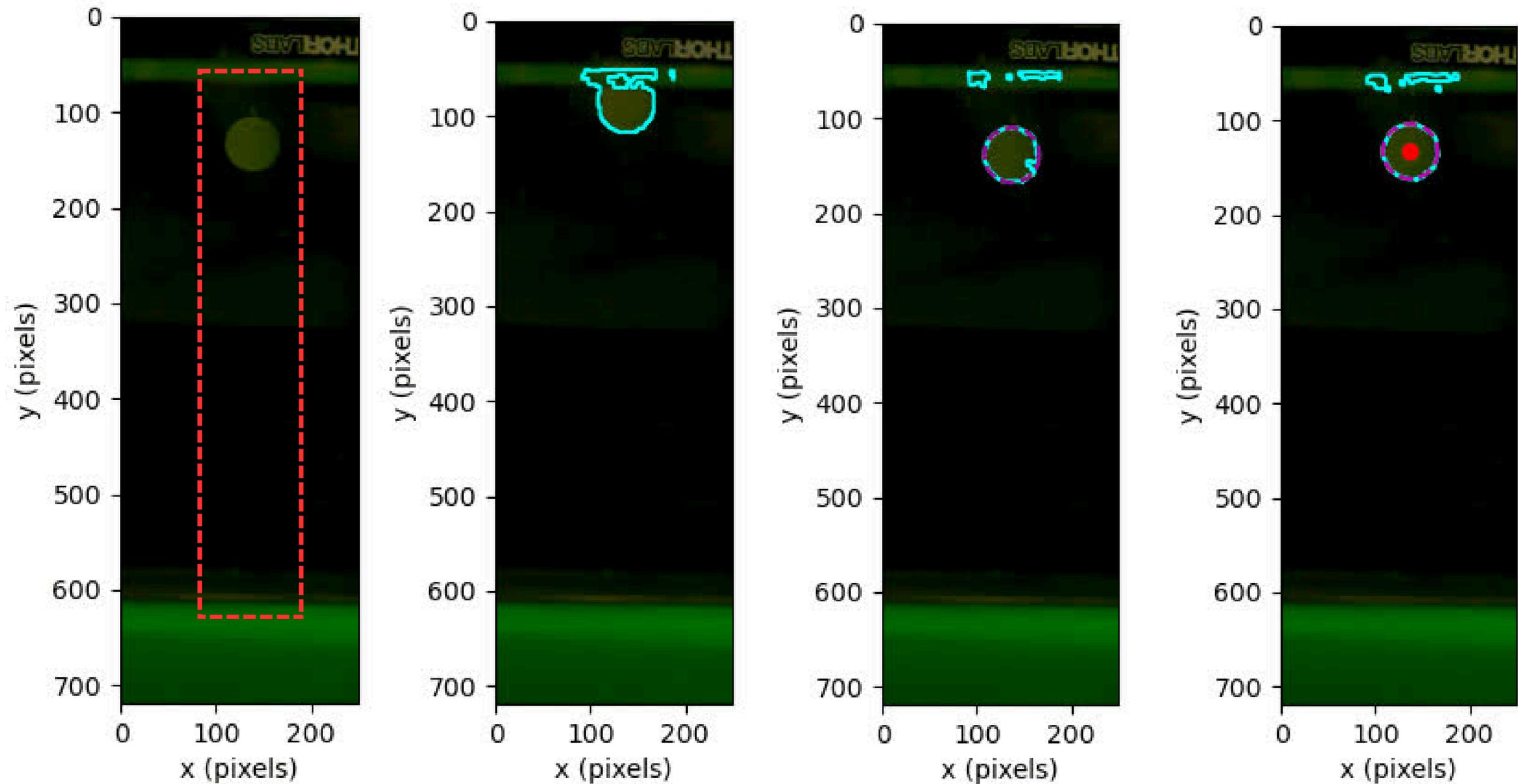
Cas interface déformable



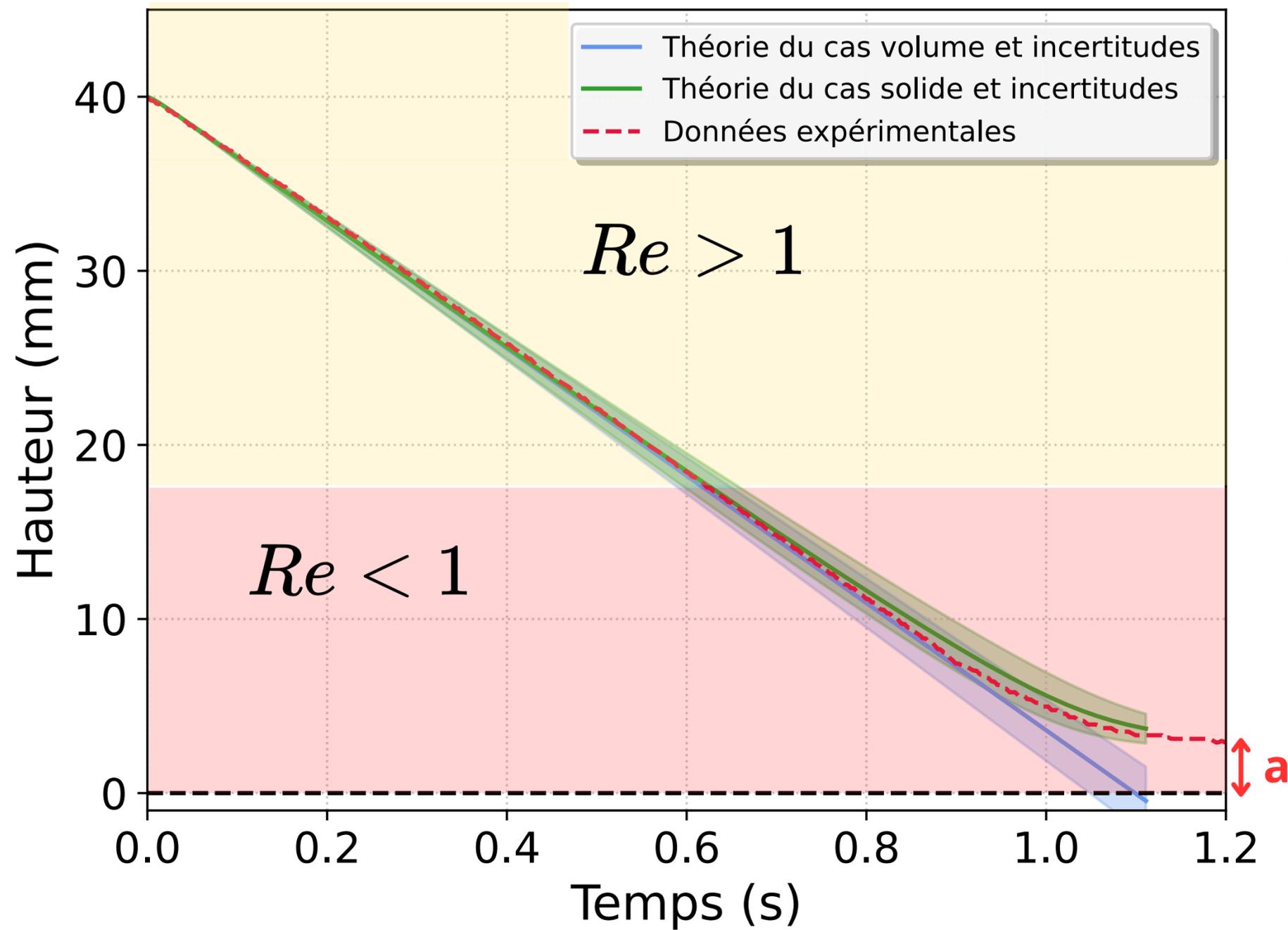
# MONTAGE EXPÉRIMENTAL



# SUIVI DE LA PARTICULE



# CAS SOLIDE ET CONSTRUCTION DU MODELE



## Régime inertiel :

$$F_i = \frac{1}{2} \rho C_x v^2 S - (\rho_{\text{particule}} - \rho_{\text{huile}}) V g$$

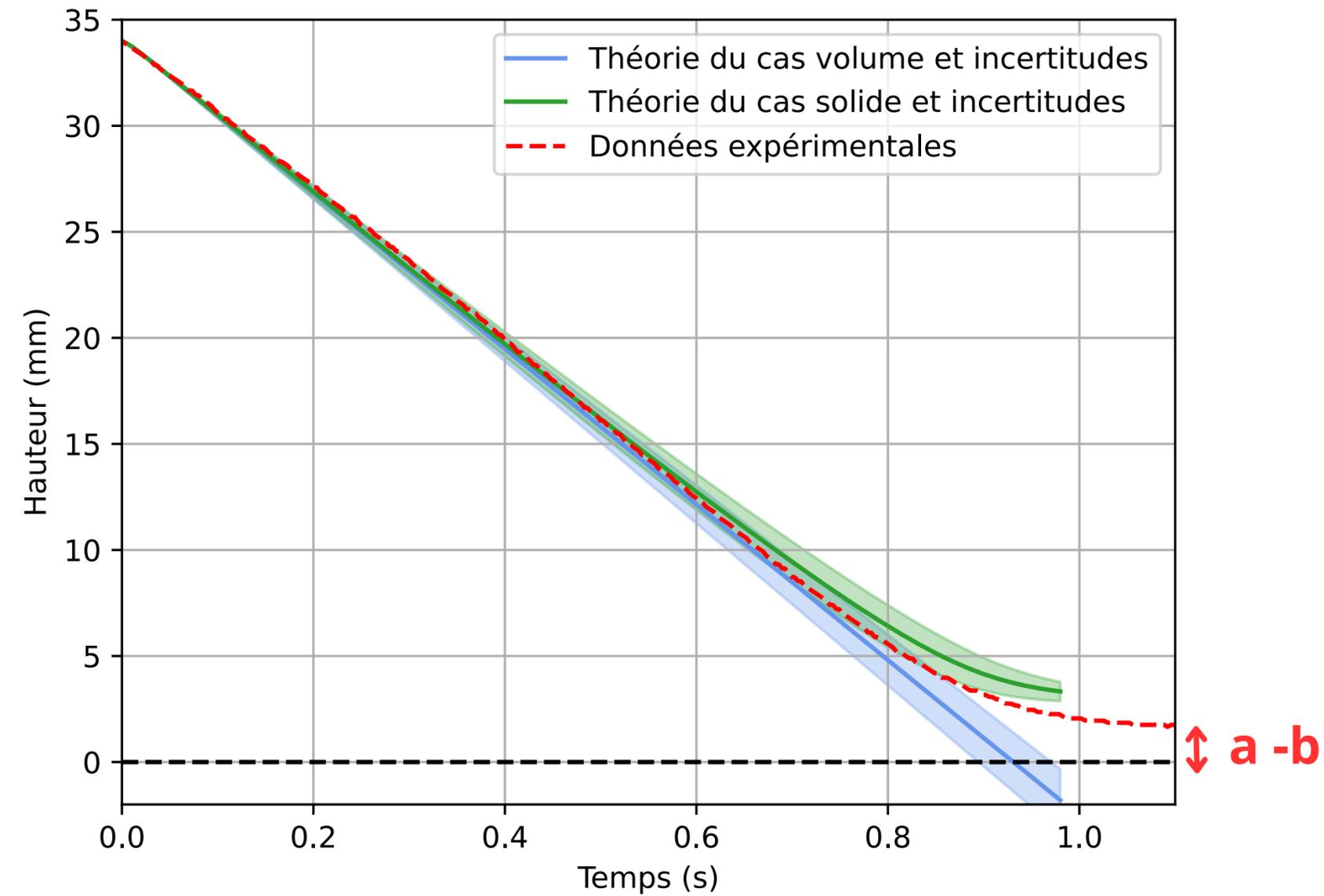
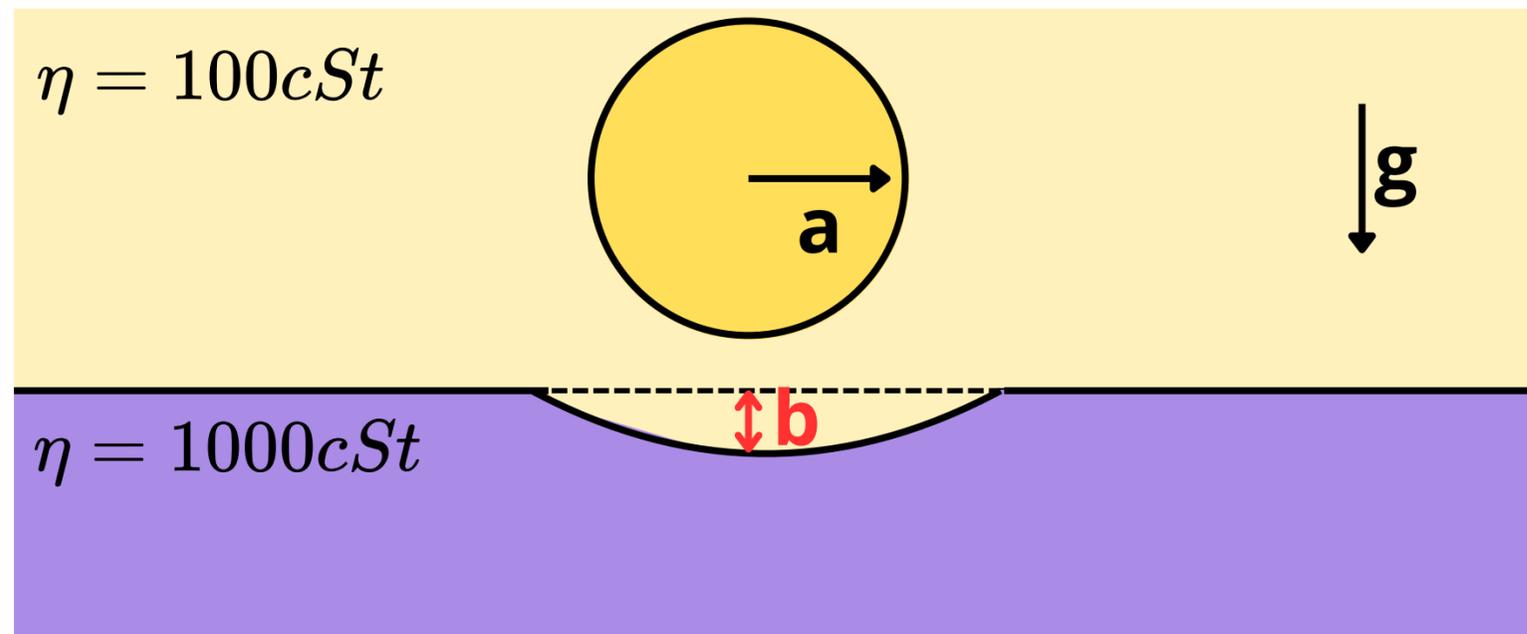
## Régime de Stokes :

$$F_s = F_i + 6\pi\eta_{\text{huile}} a v (\lambda_{\perp} - 1)$$

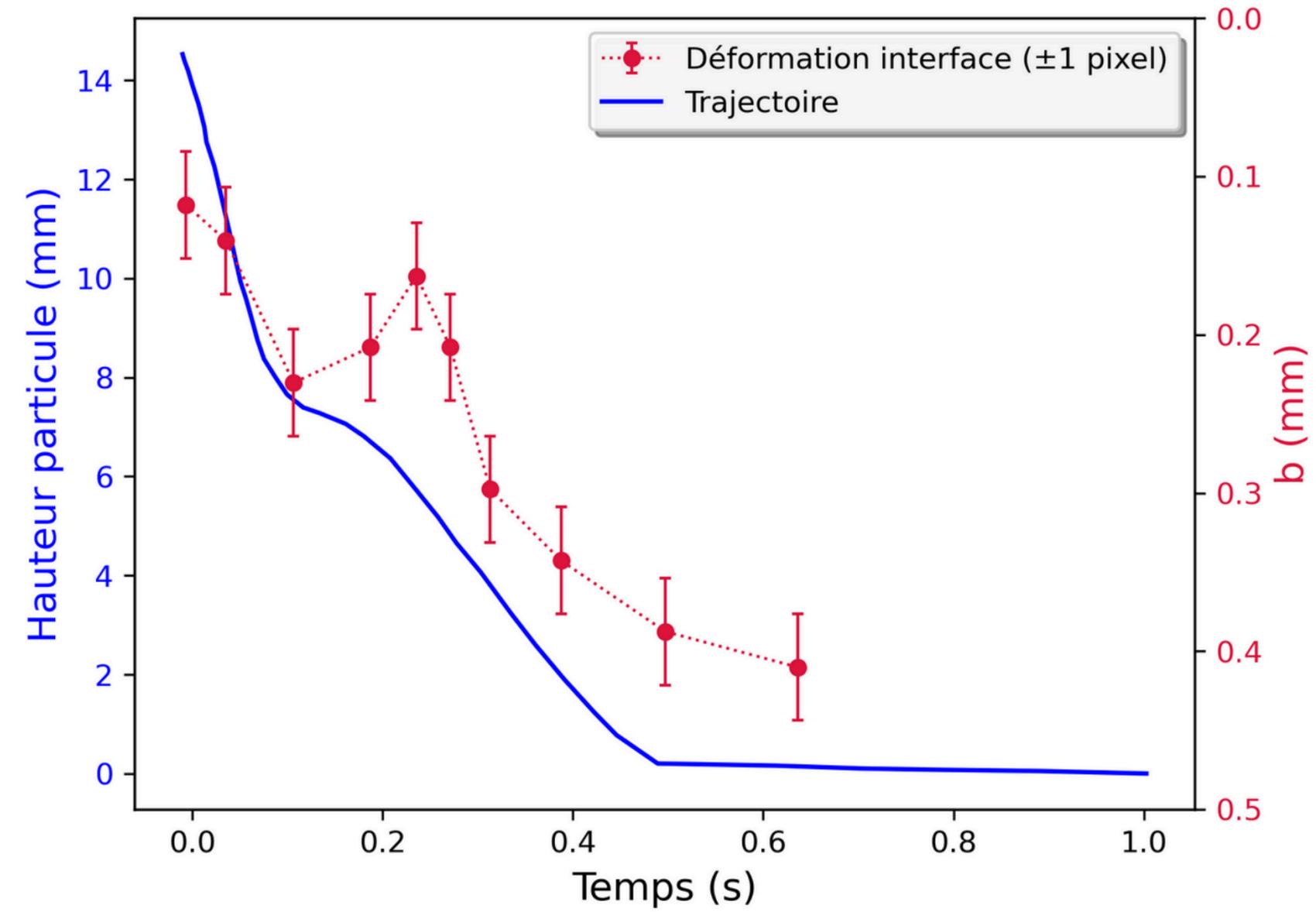
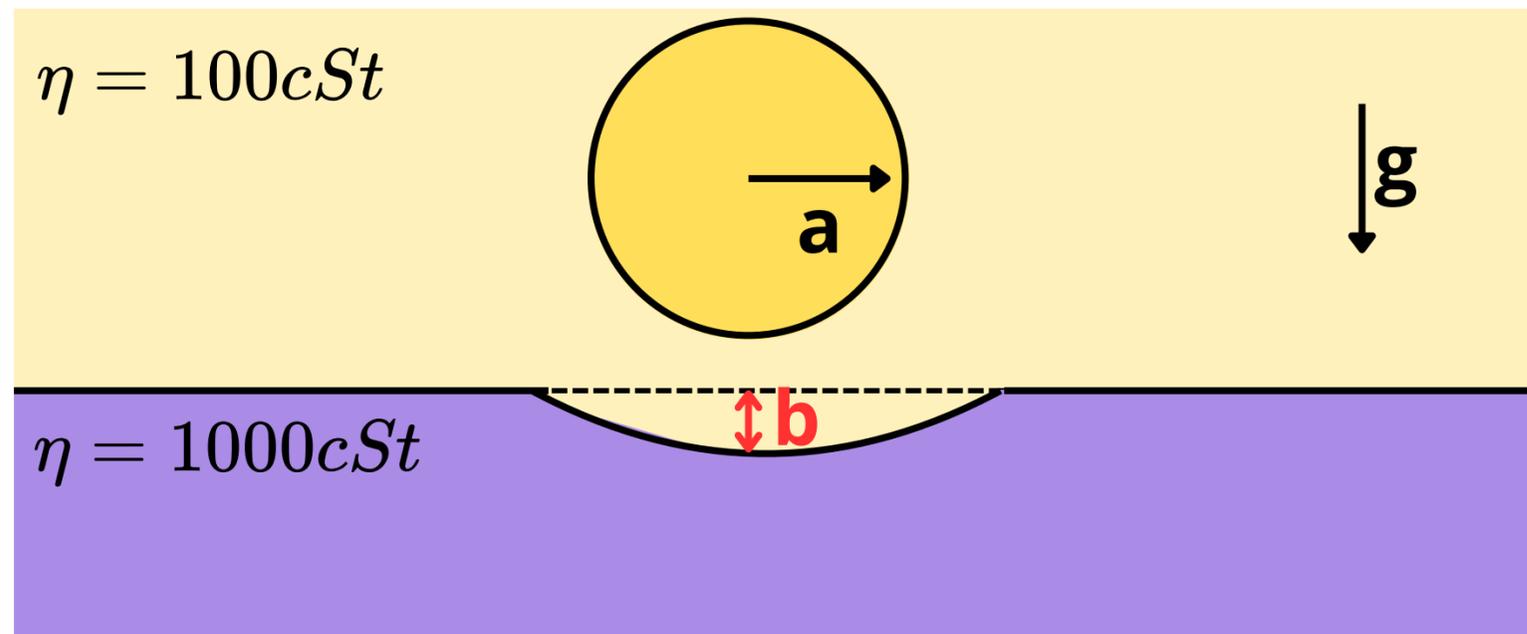
$$\lambda_{\perp} = \frac{6z^2 + 9az + 2a^2}{6z^2 + 2az}$$

M.Lavaud, *Confined Brownian Motion*, 2021

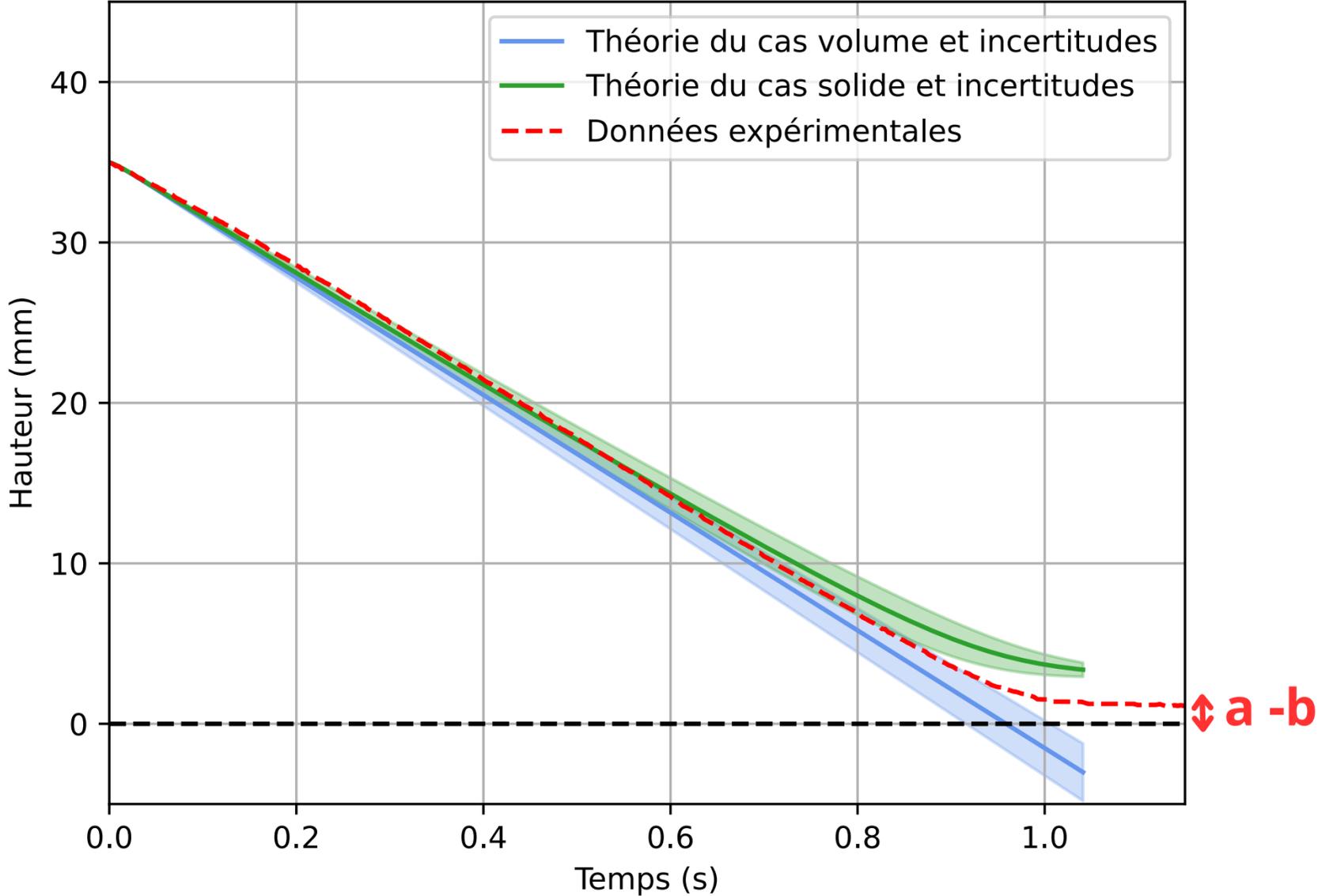
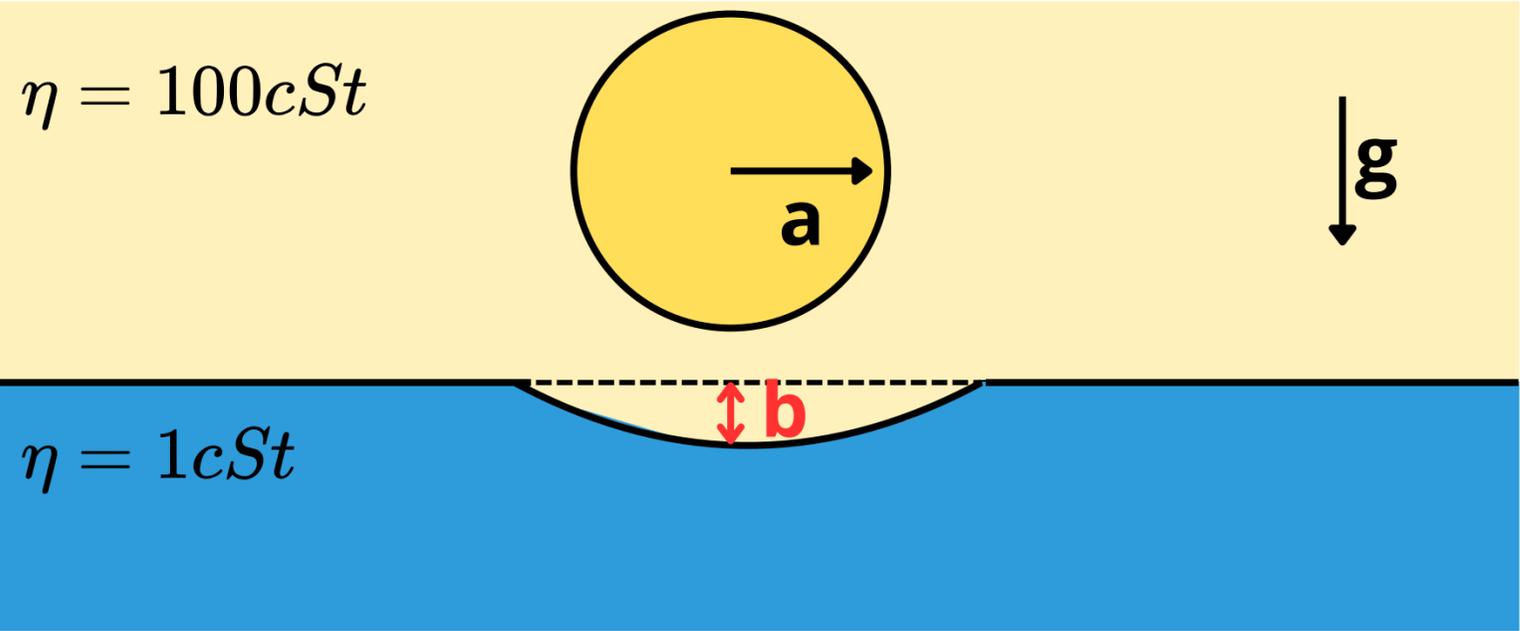
# INTERFACE HUILE-GLYCÉROL



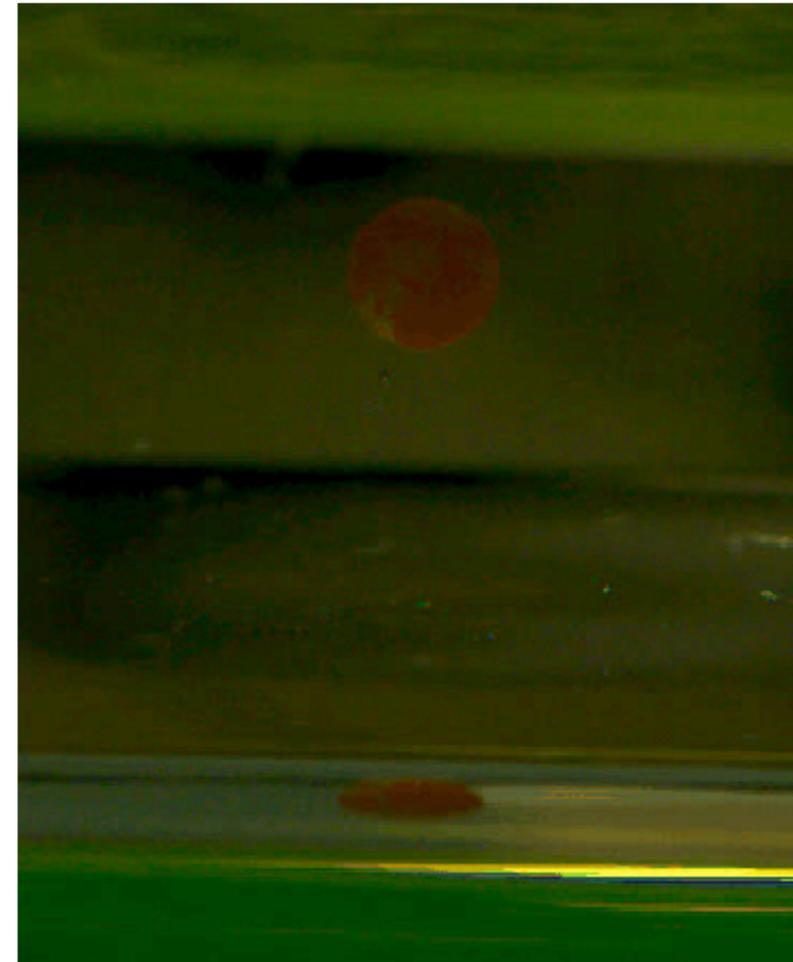
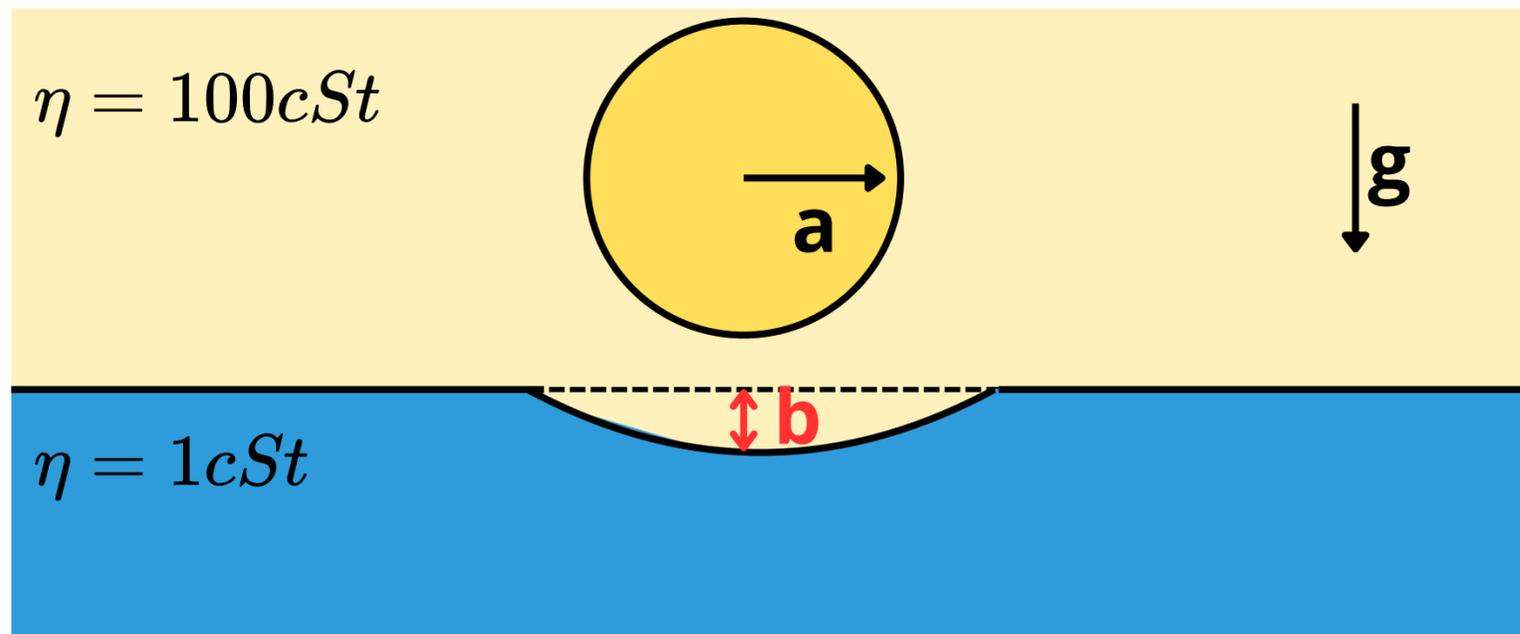
# INTERFACE HUILE-GLYCÉROL



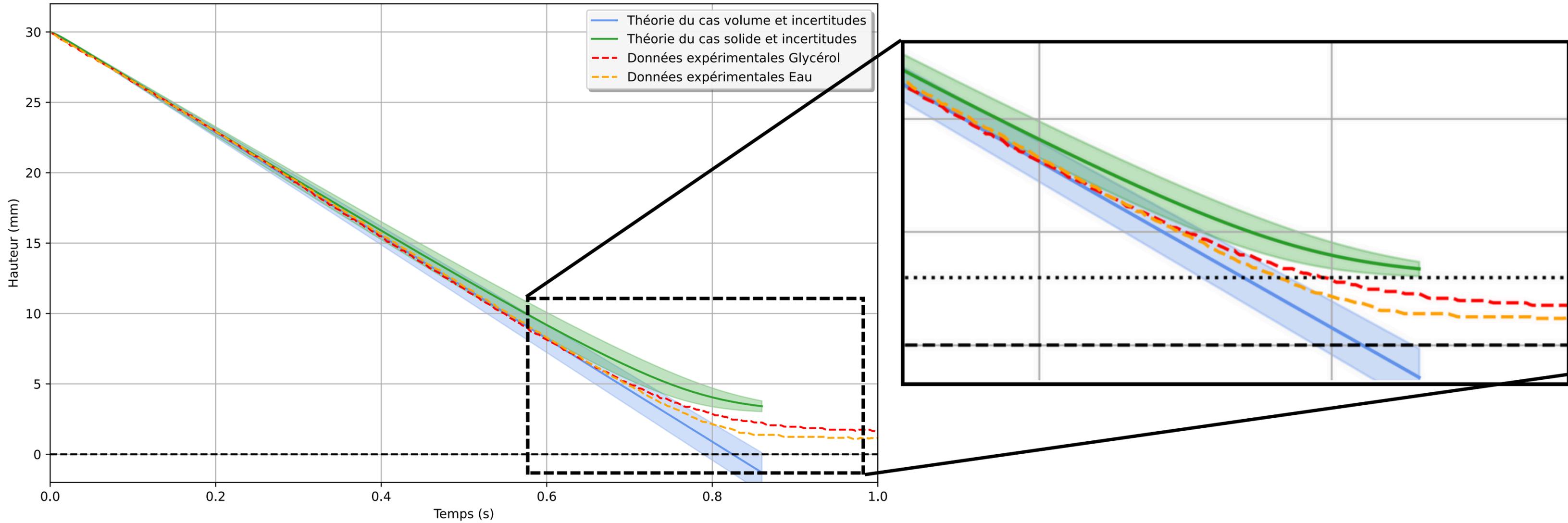
# INTERFACE HUILE-EAU



# INTERFACE HUILE-EAU



# COMPARAISON



# CONCLUSION

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Etude de la trajectoire



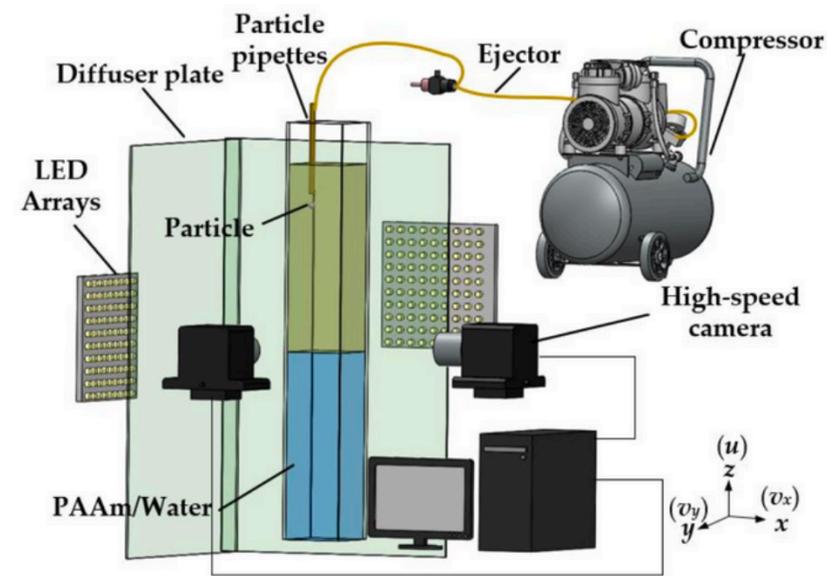
Effets entre particule/interface



Influence de la nature de l'interface

# PERSPECTIVES

- Amélioration montage



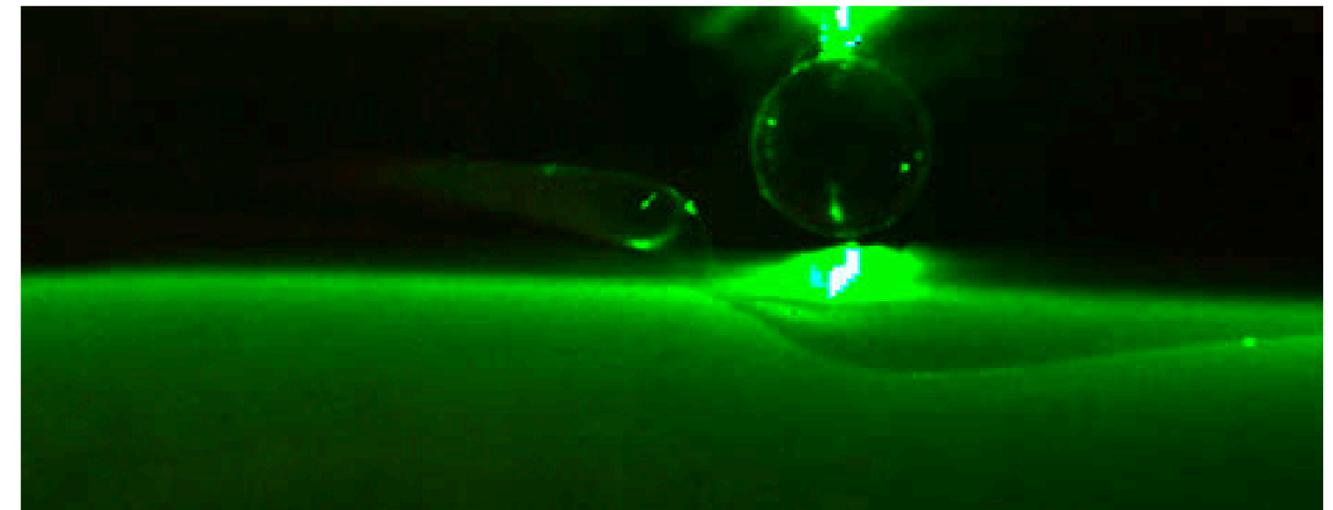
Minglu Dai et al, Micromachines, 2022

- Tester la validité de la théorie

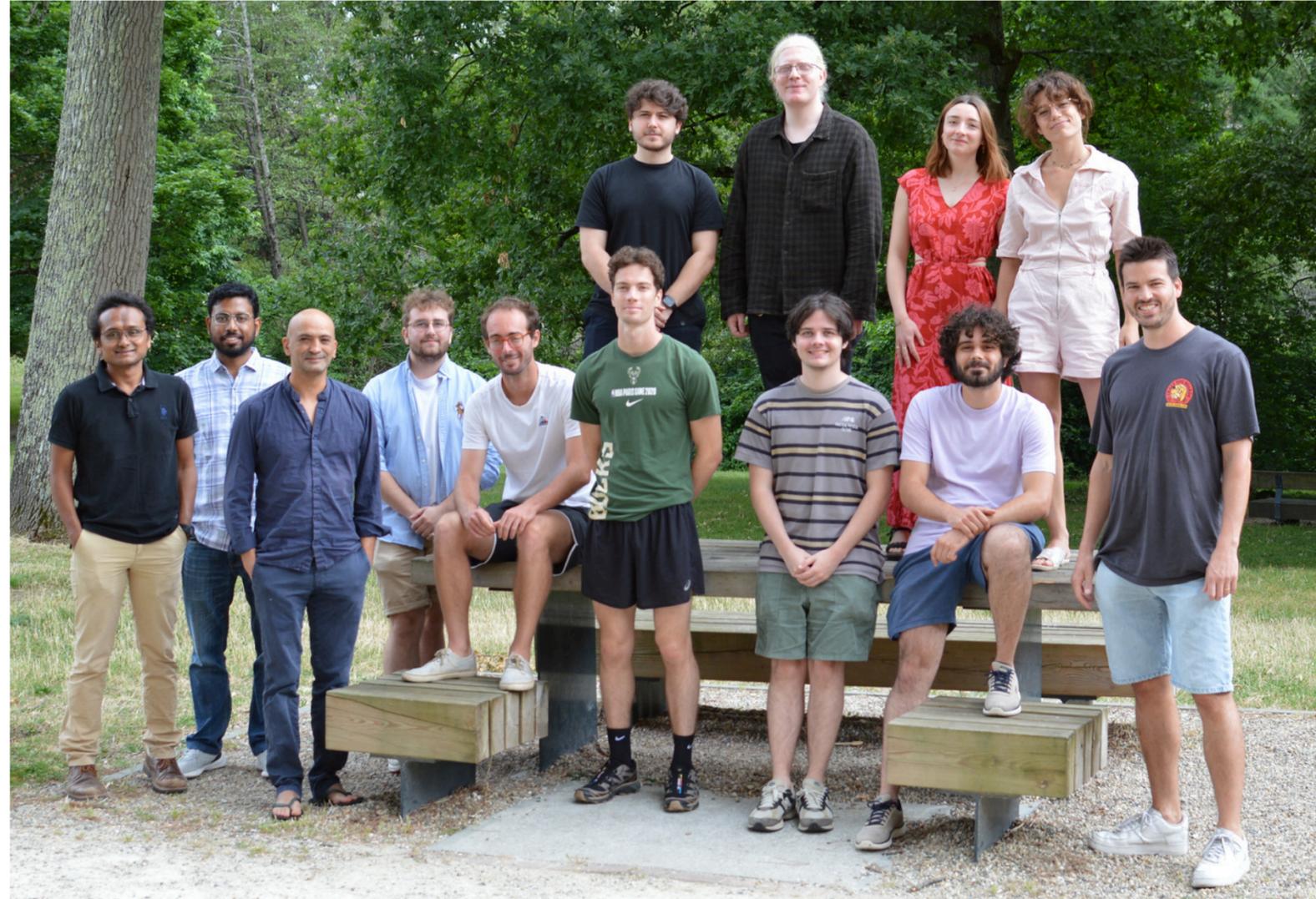
$$f_{z,1} \simeq \alpha_U^2 \frac{\eta^2 u^2 a^3}{\sigma d^2} - \alpha_{\dot{D}^2} \frac{\eta^2 \dot{d}^2 a^4}{\sigma d^3} + \alpha_{\ddot{D}} \frac{\eta^2 \ddot{d} a^4}{\sigma d^3}$$

*Aditya Jha et al, JFM, 2024*

- Nouvel axe d'étude :



# REMERCIEMENTS



## Équipe EMetBrown :

- Chercheurs permanents : Thomas Salez et Yacine Amarouchene
- Post-doctorants : Marc Lagoin et Anirban Chatterjee
- Doctorants : Gaëlle Audéoud, Juliette Lacherez, Quentin Ferreira, Nicolas Fares et Guirec de Tourmenire
- Stagiaires : Pierre Grésil et Agim Gjuzi