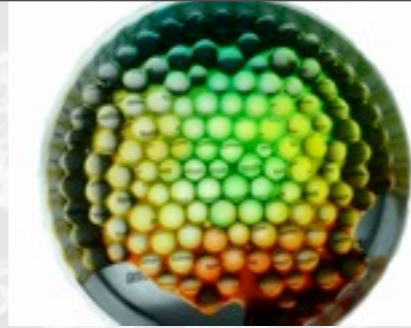




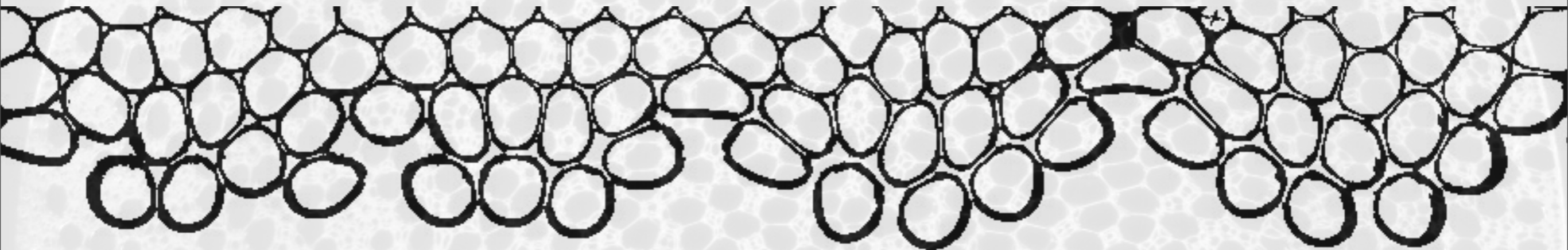
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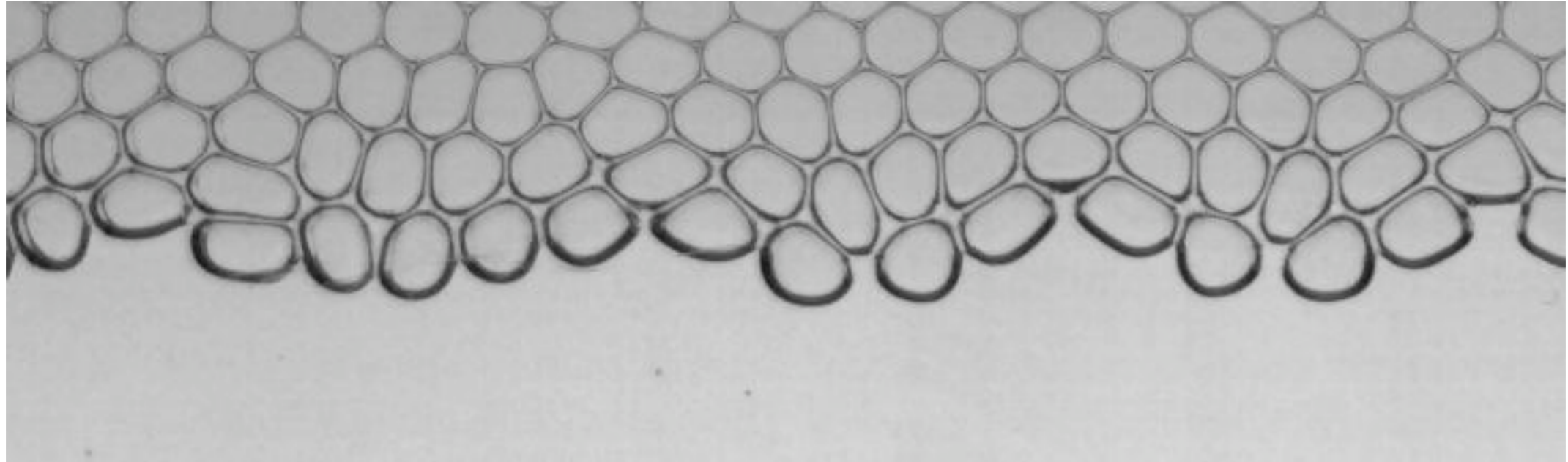
# ***Interfaces mousse-liquide***



Ariane Bronfort  
Lunch meeting GRASP

17 mars 2011

# Instabilité de Faraday à l'interface

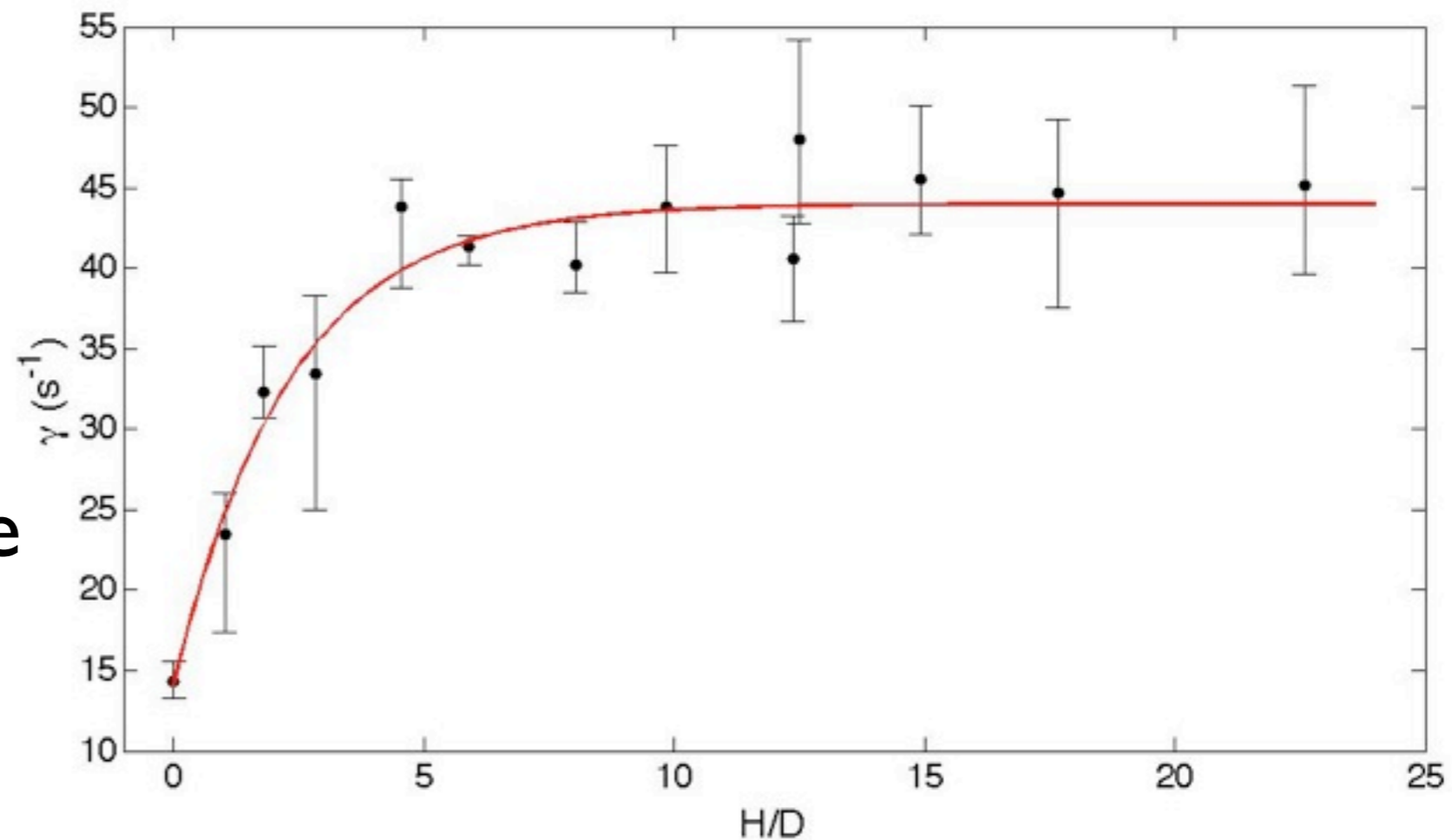


$$y(t) \propto e^{-\gamma t}$$

$\gamma$  : Coefficient  
d'amortissement

H/D : hauteur normalisée

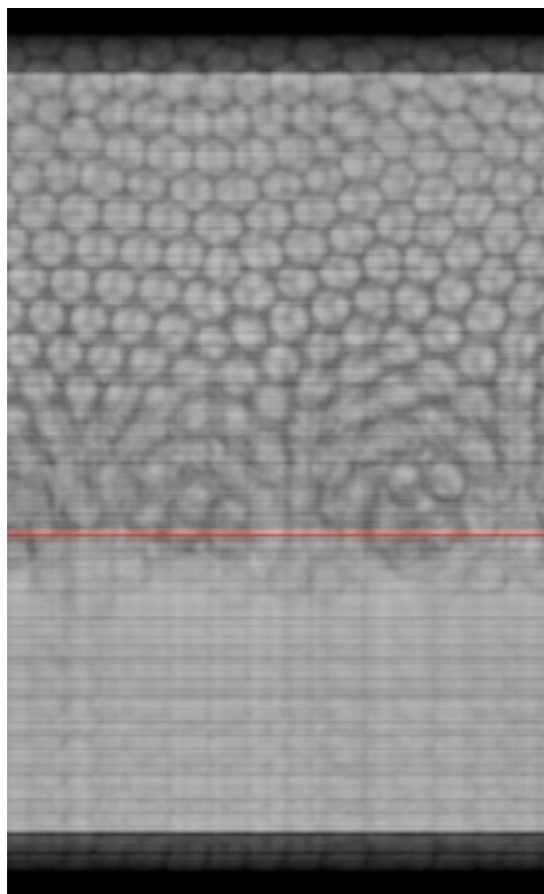
→  $h^*$  fonction de D



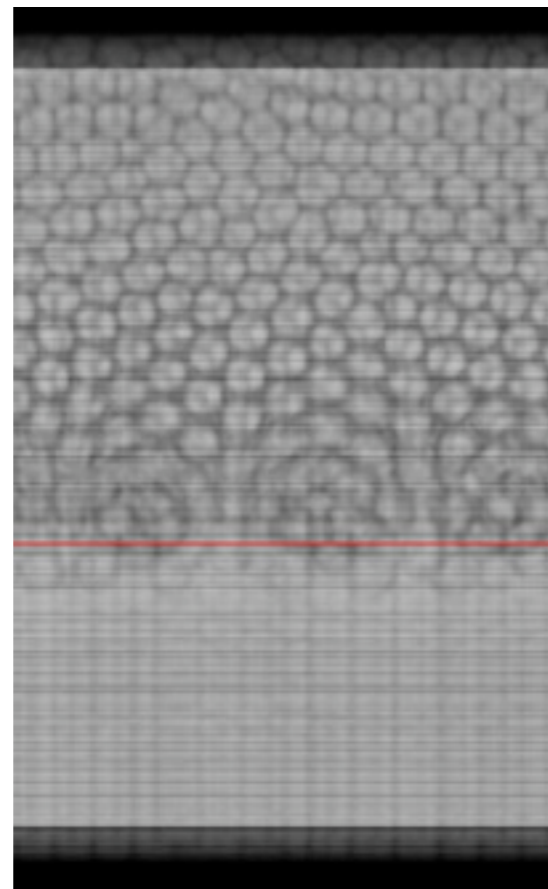
# ***Instabilité de Faraday à l'interface***

Bulles  $D=1.5\text{mm}$

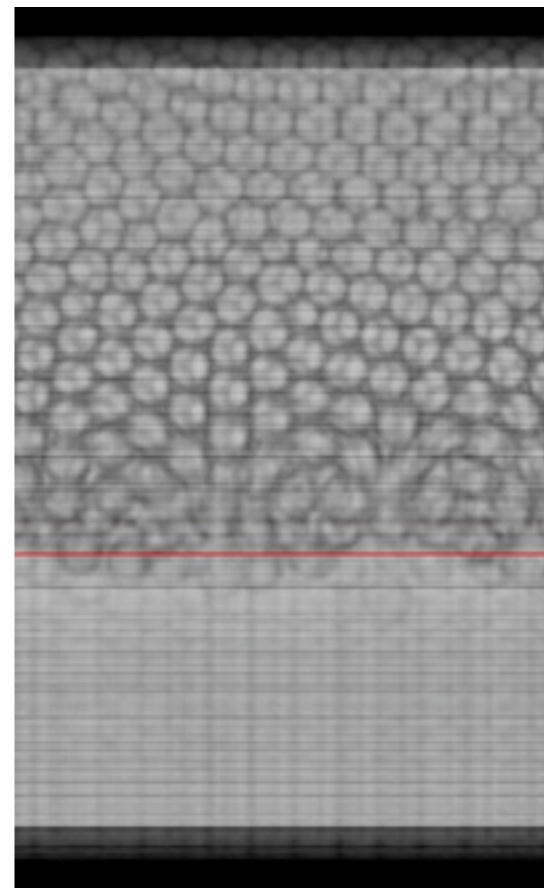
20Hz



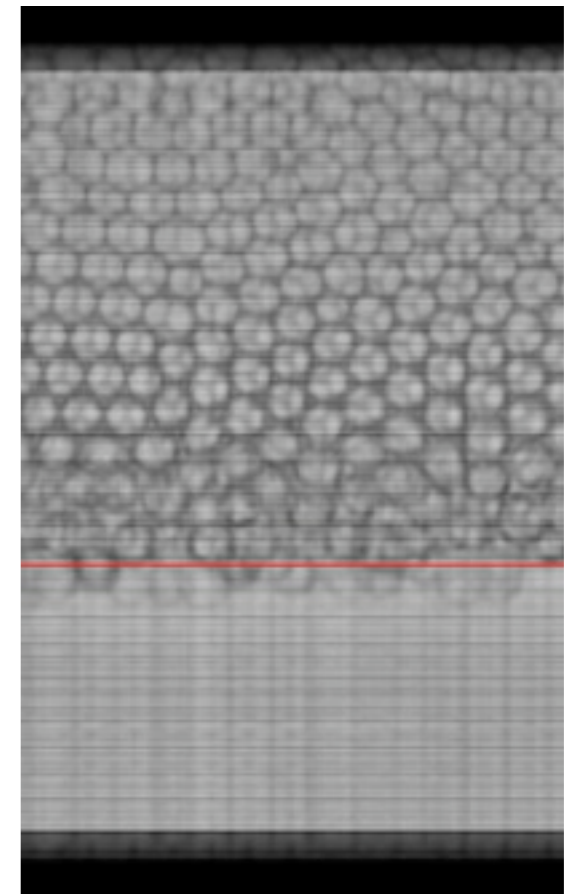
22Hz



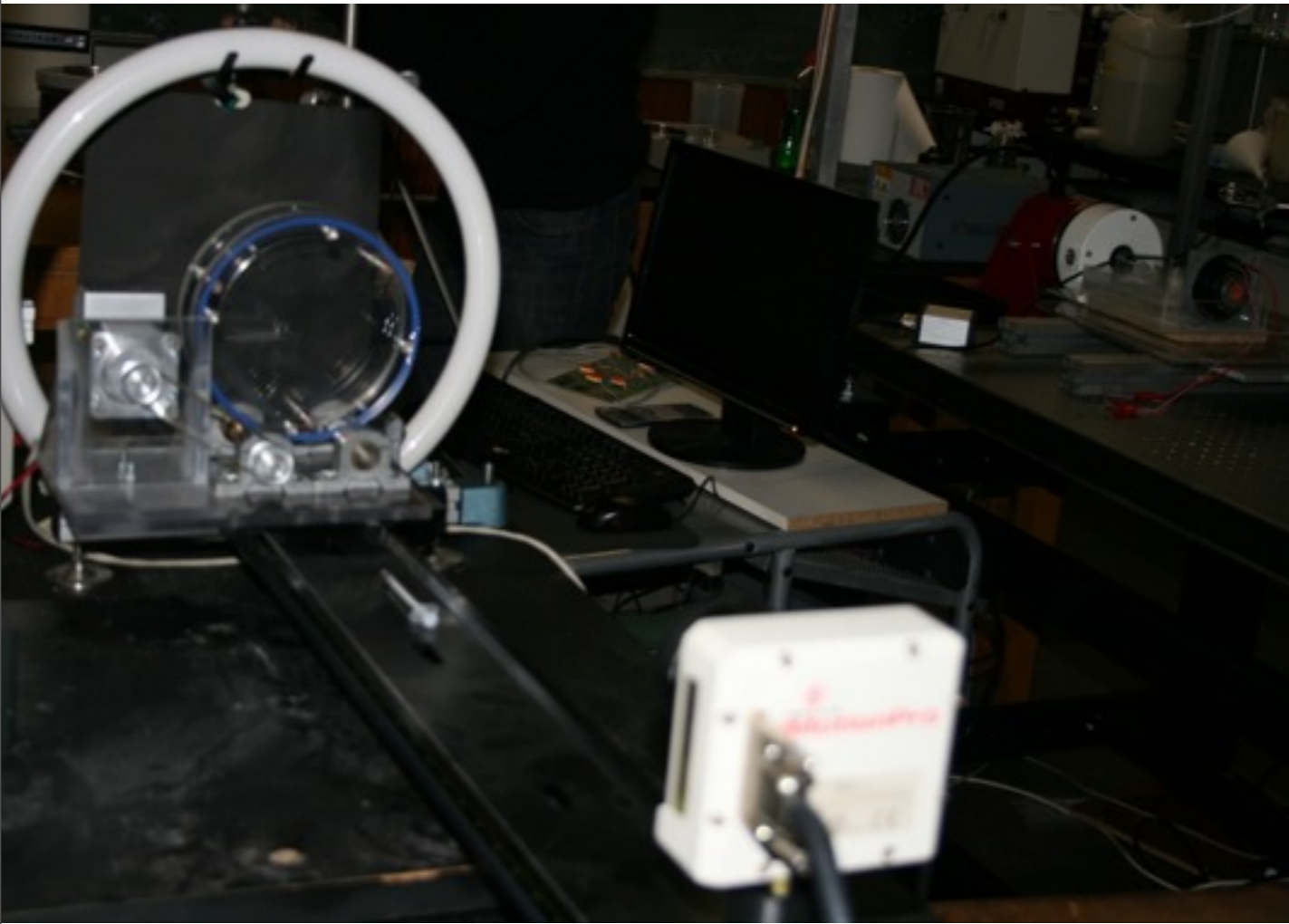
24Hz



26Hz



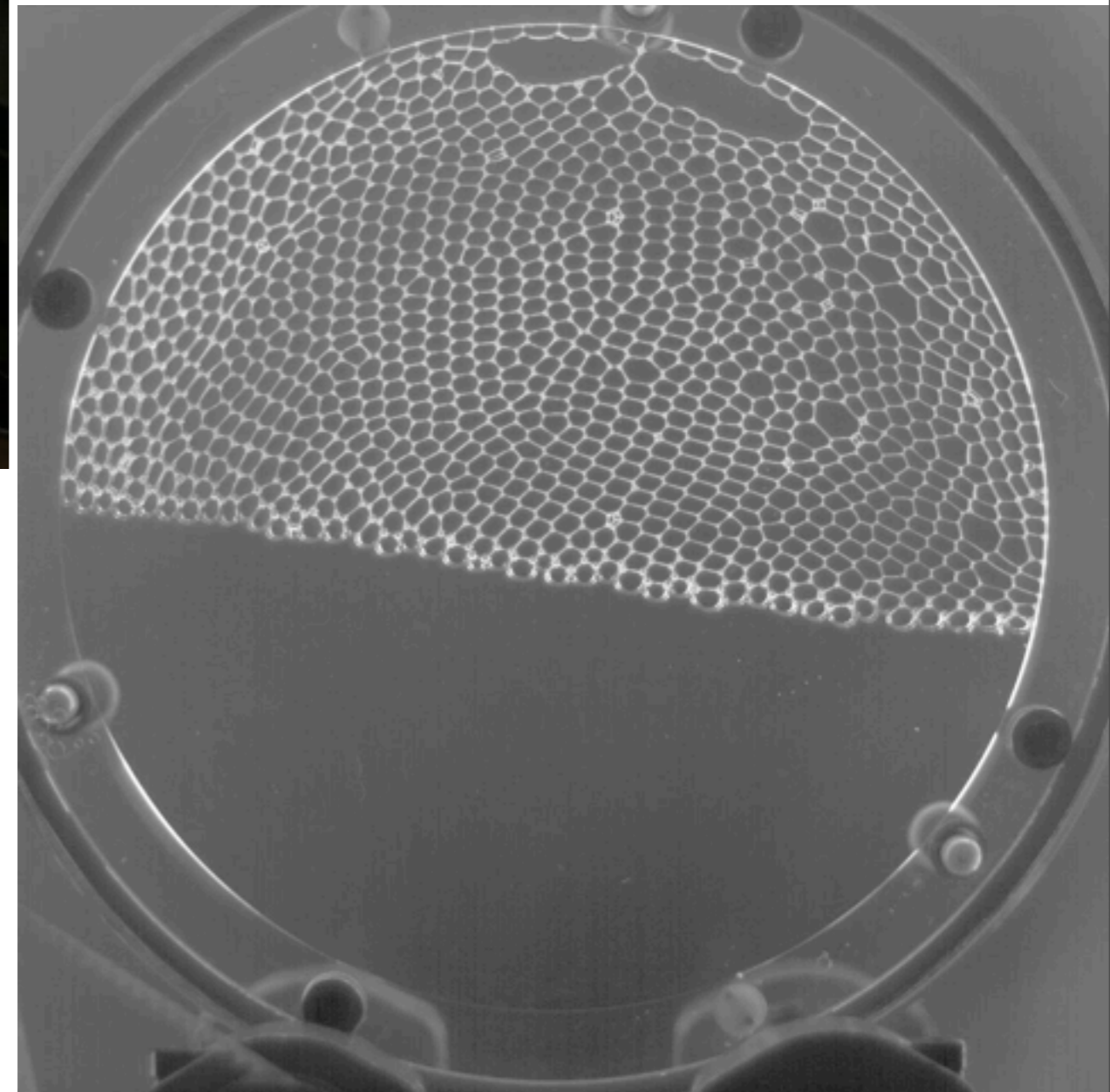
# Mousse et tambour tournant



$$R_{cell} \simeq 65 \text{ mm}$$

$$e \simeq 3 \text{ mm}$$

Surfactant commercial



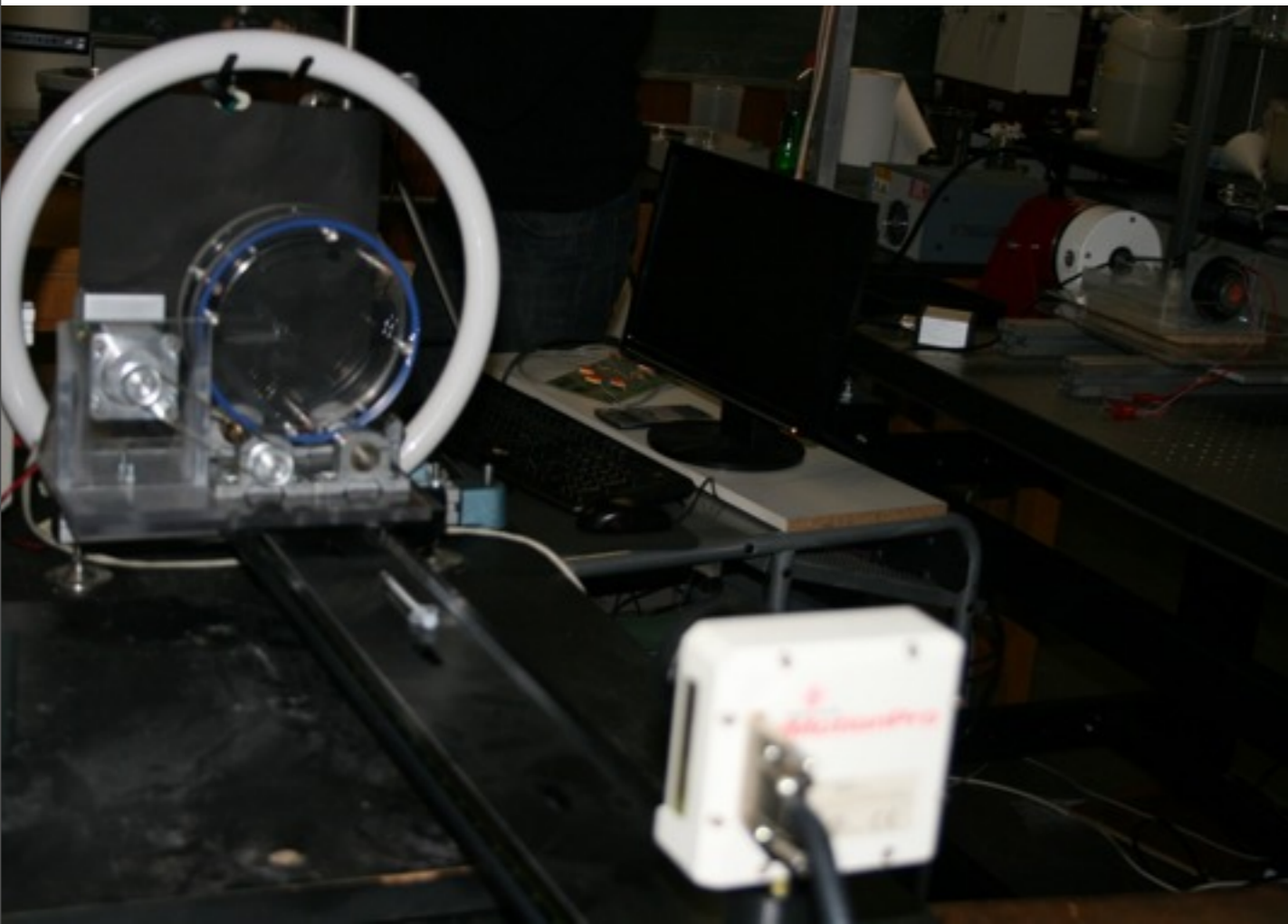
Paramètres variables:

$$D \simeq [1; 3] \text{ mm}$$

$$\omega \simeq [0; 2.6] \text{ rad/s}$$

$$\phi_{liq} \simeq [0.1; 0.55]$$

# Mousse et tambour tournant



$$R_{cell} \simeq 65 \text{ mm}$$

$$e \simeq 3 \text{ mm}$$

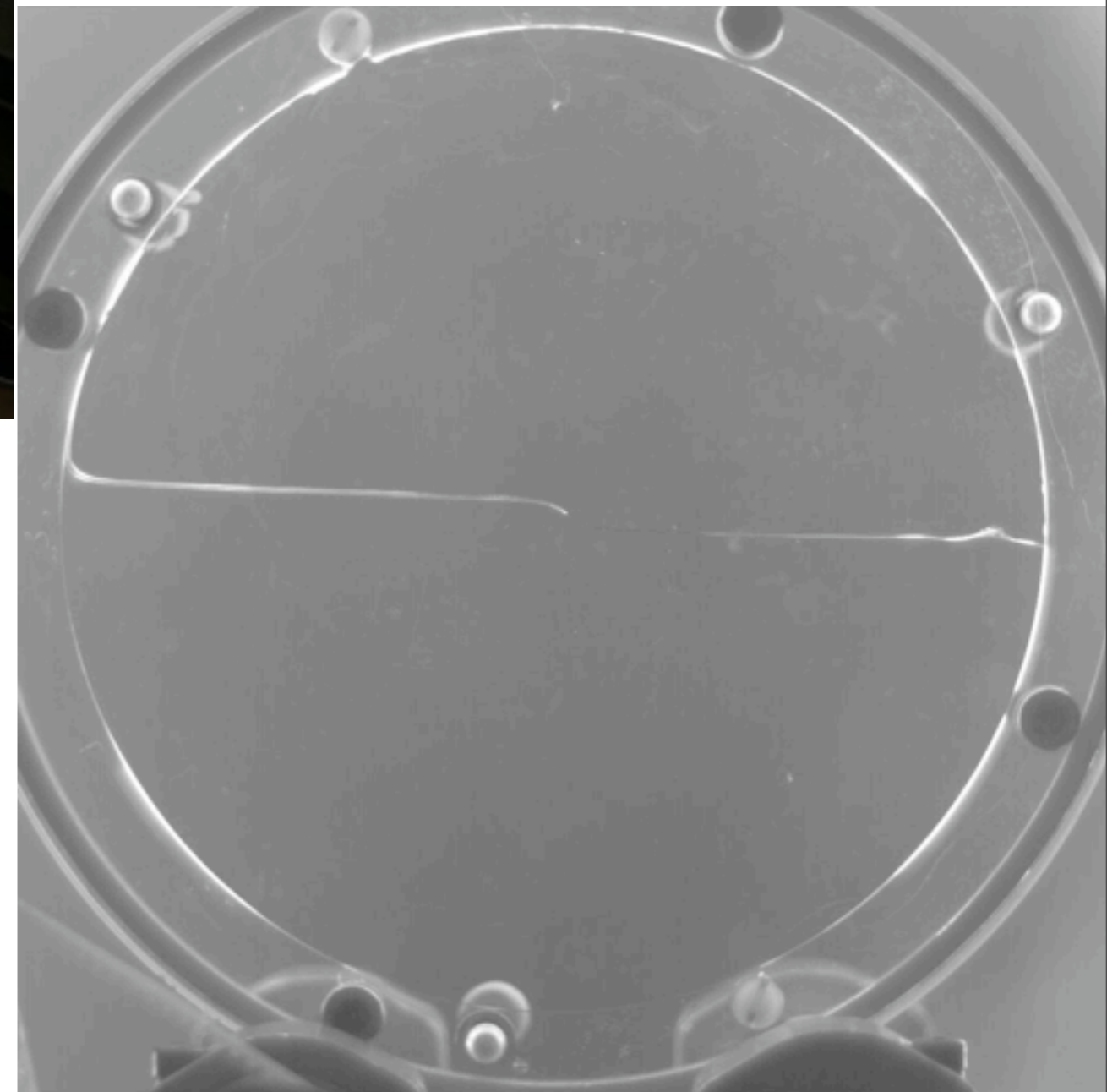
Surfactant commercial

Paramètres variables:

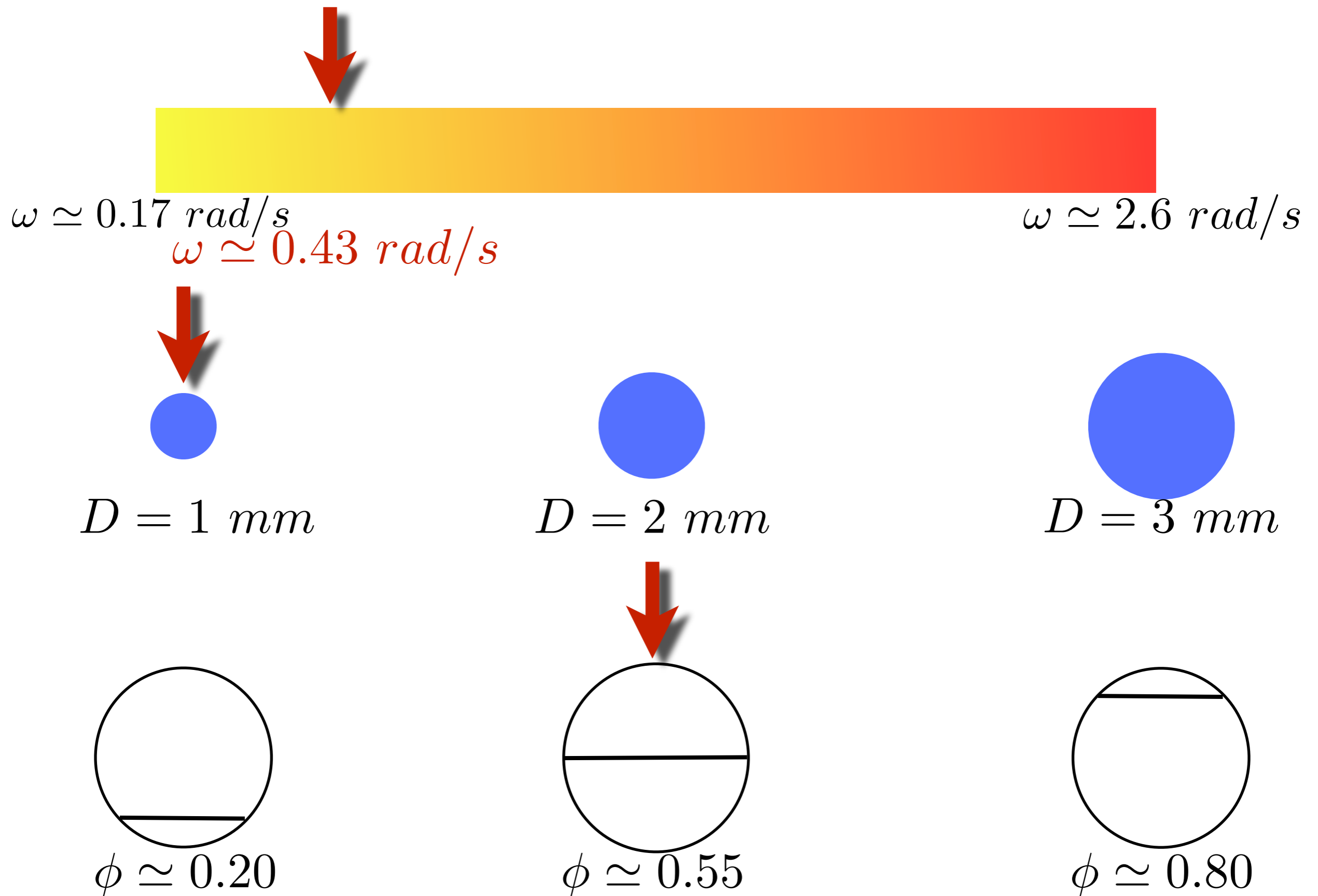
$$D \simeq [1; 3] \text{ mm}$$

$$\omega \simeq [0; 2.6] \text{ rad/s}$$

$$\phi_{liq} \simeq [0.1; 0.55]$$

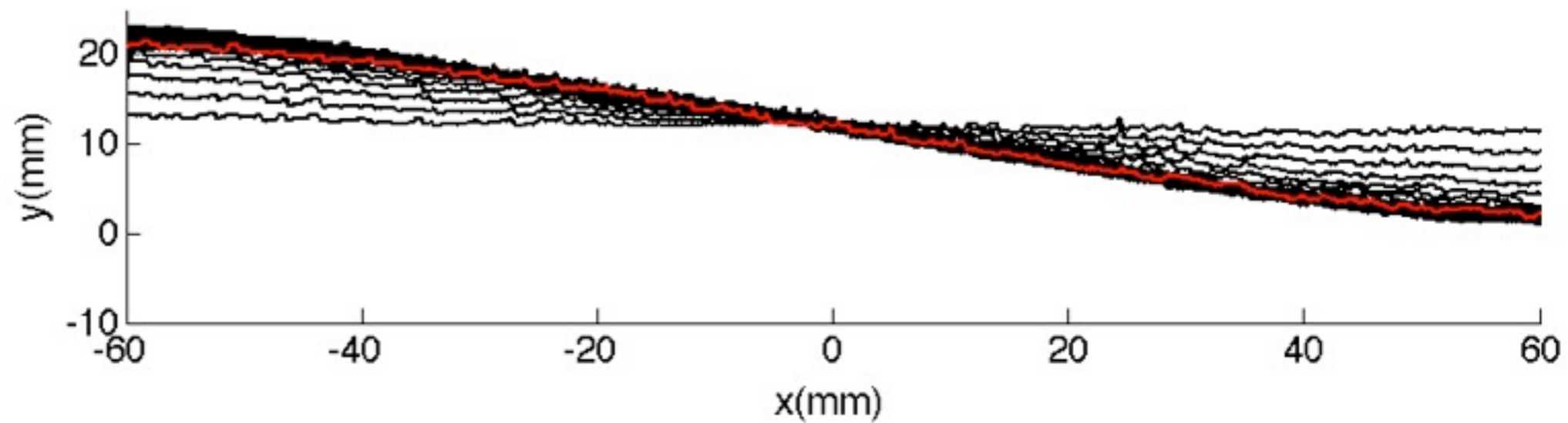
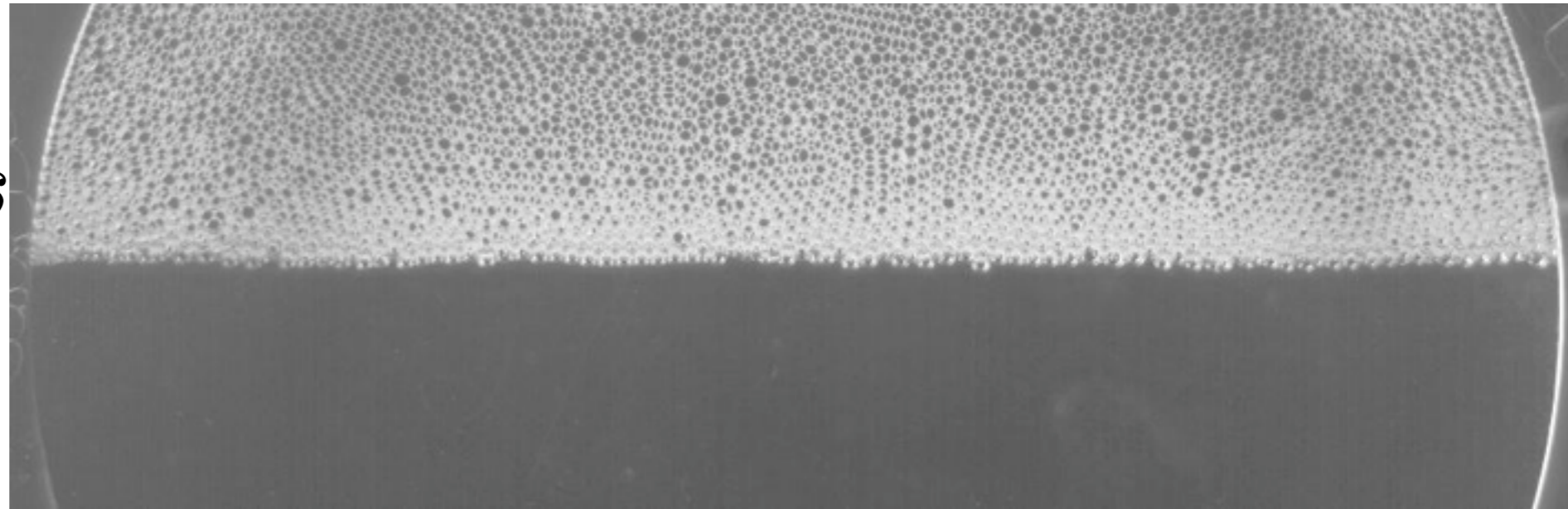


# Paramètres



# Tambour: régime transitoire

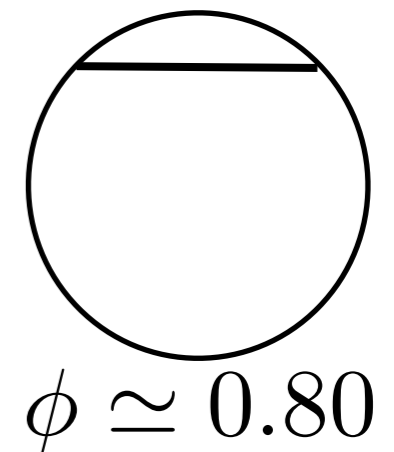
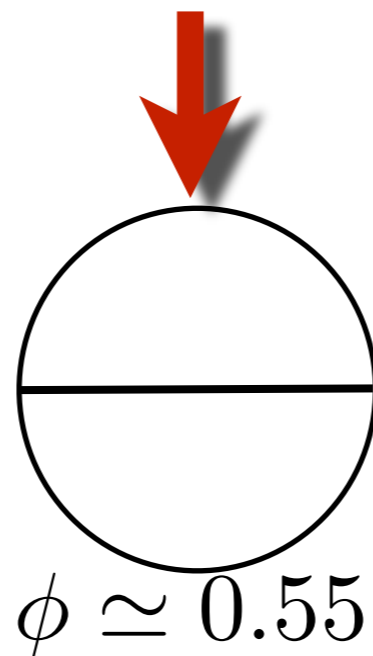
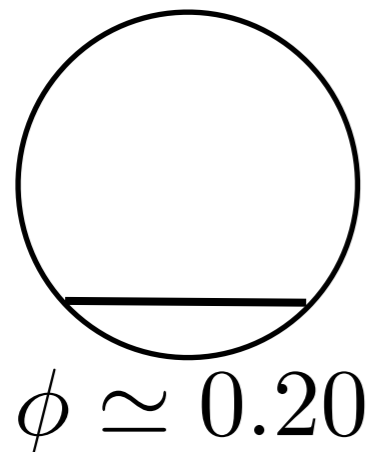
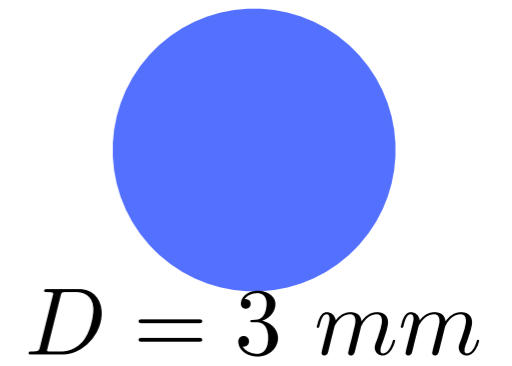
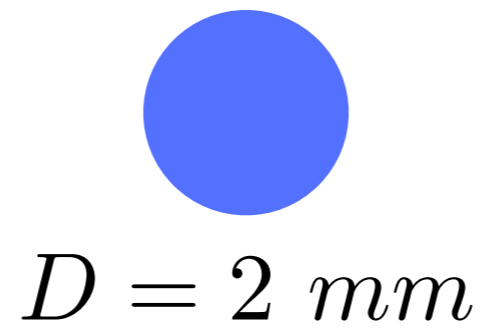
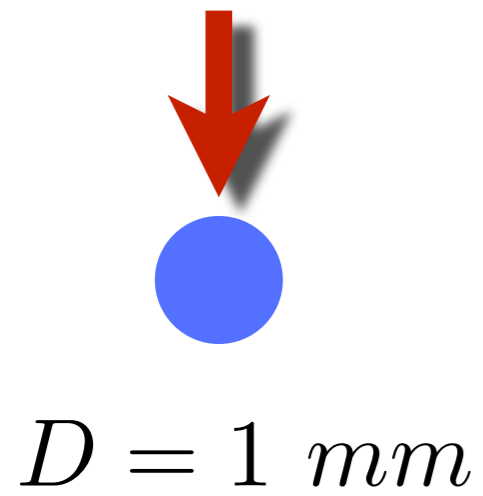
$$\omega \simeq 0.43 \text{ rad/s}$$



1 courbe/0.1 s

Images centrées sur le centre de la cellule

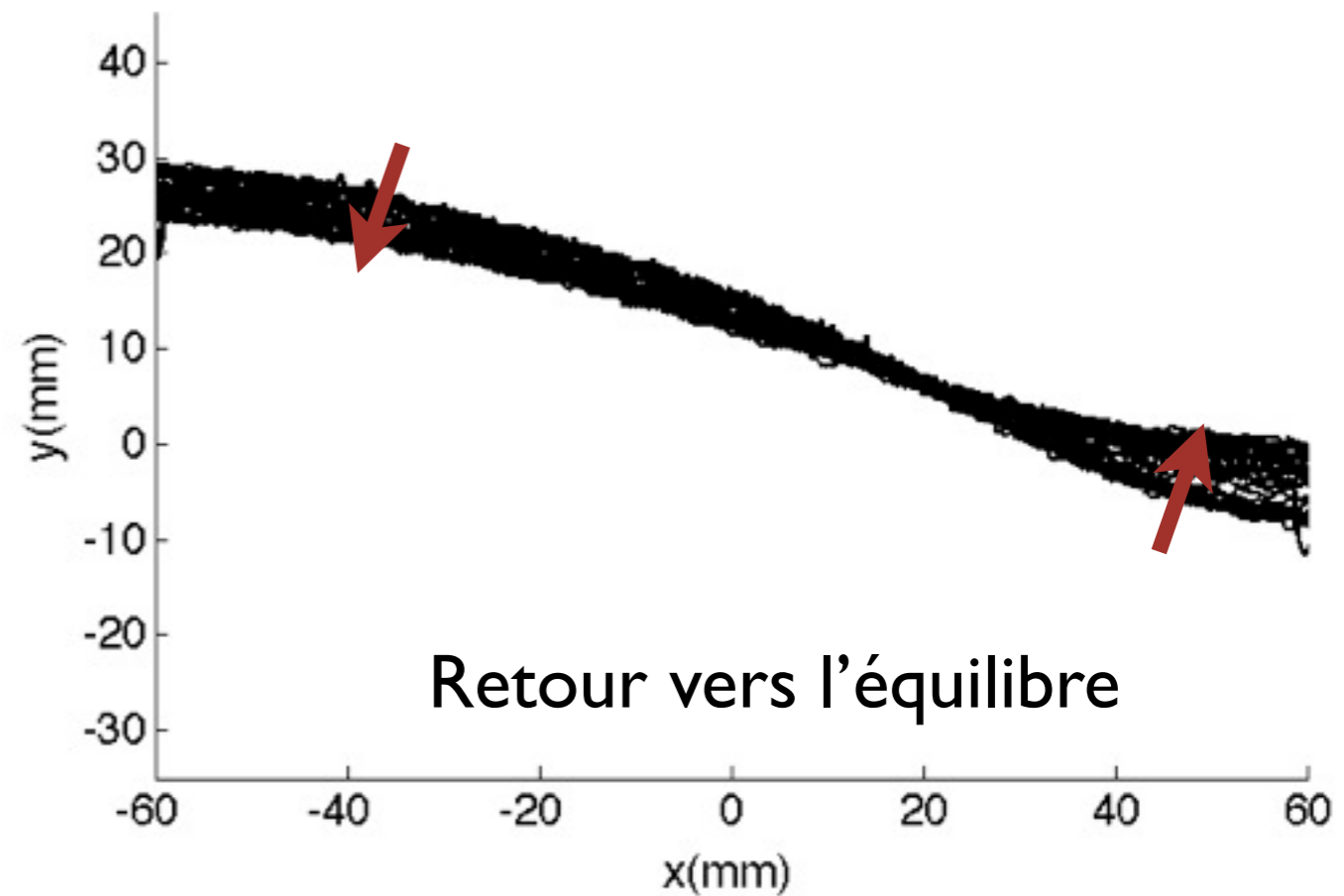
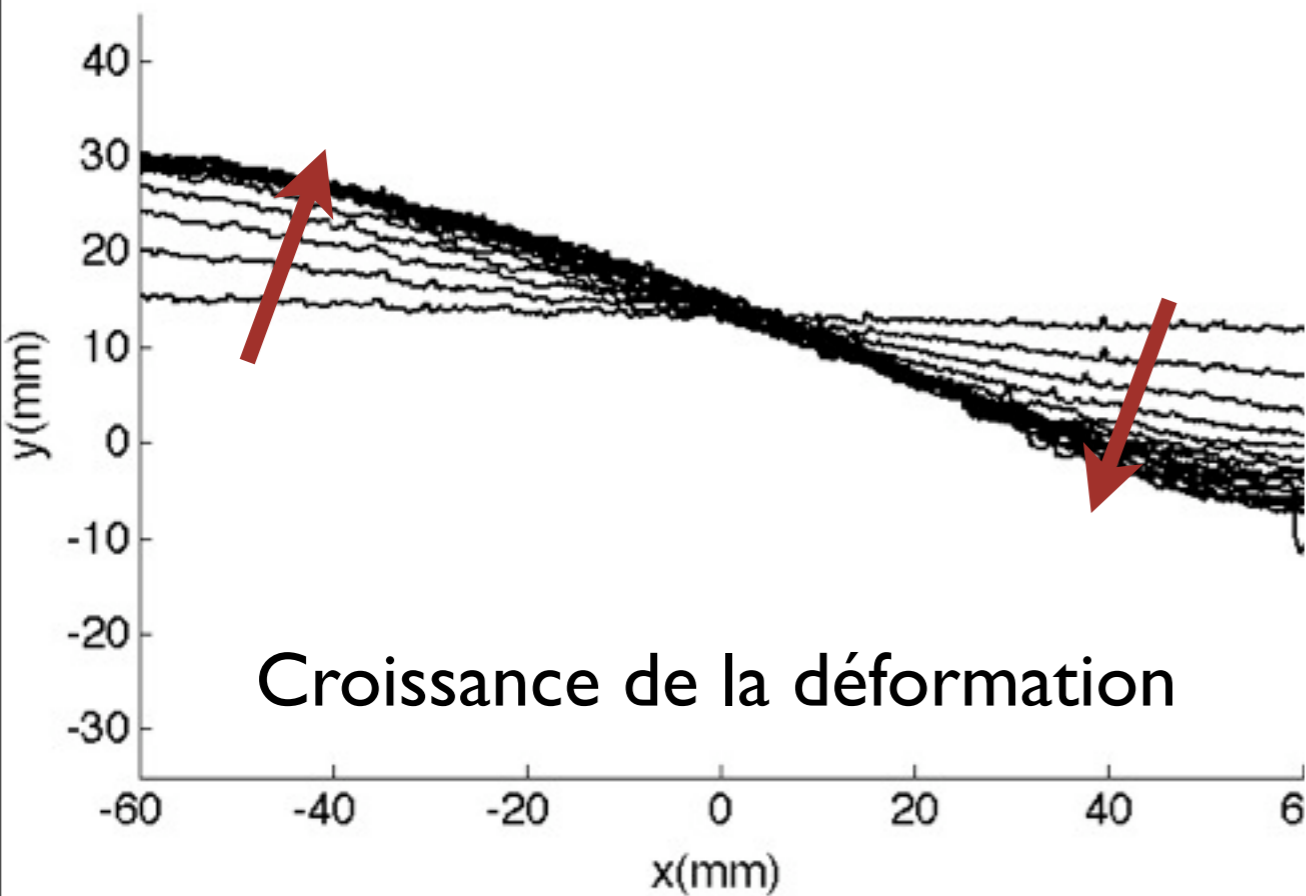
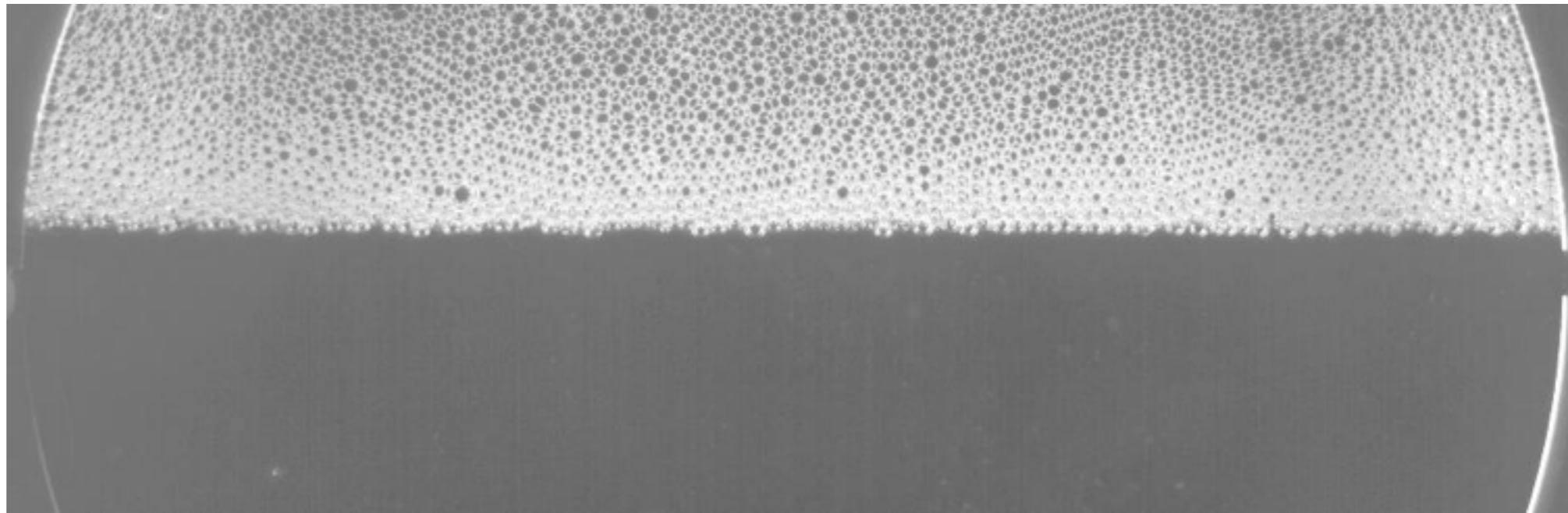
# Paramètres





# Tambour: régime transitoire

$$\omega \simeq 0.87 \text{ rad/s}$$



# Paramètres



$\omega \simeq 0.17 \text{ rad/s}$   $\omega \simeq 0.87 \text{ rad/s}$

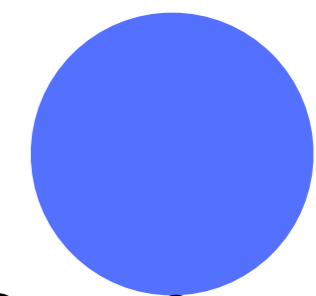
$\omega \simeq 2.6 \text{ rad/s}$



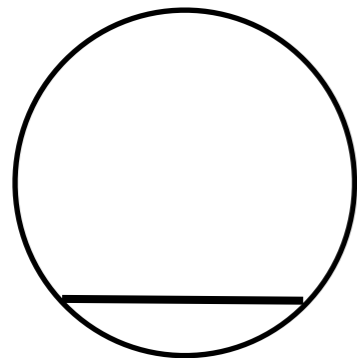
$D = 1 \text{ mm}$



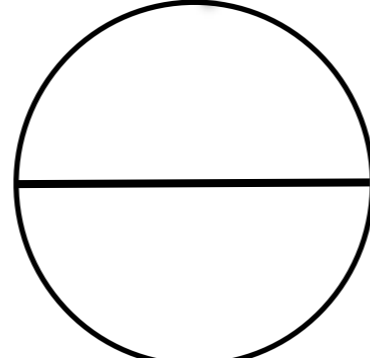
$D = 2 \text{ mm}$



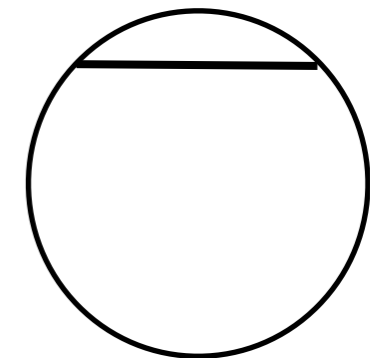
$D = 3 \text{ mm}$



$\phi \simeq 0.20$



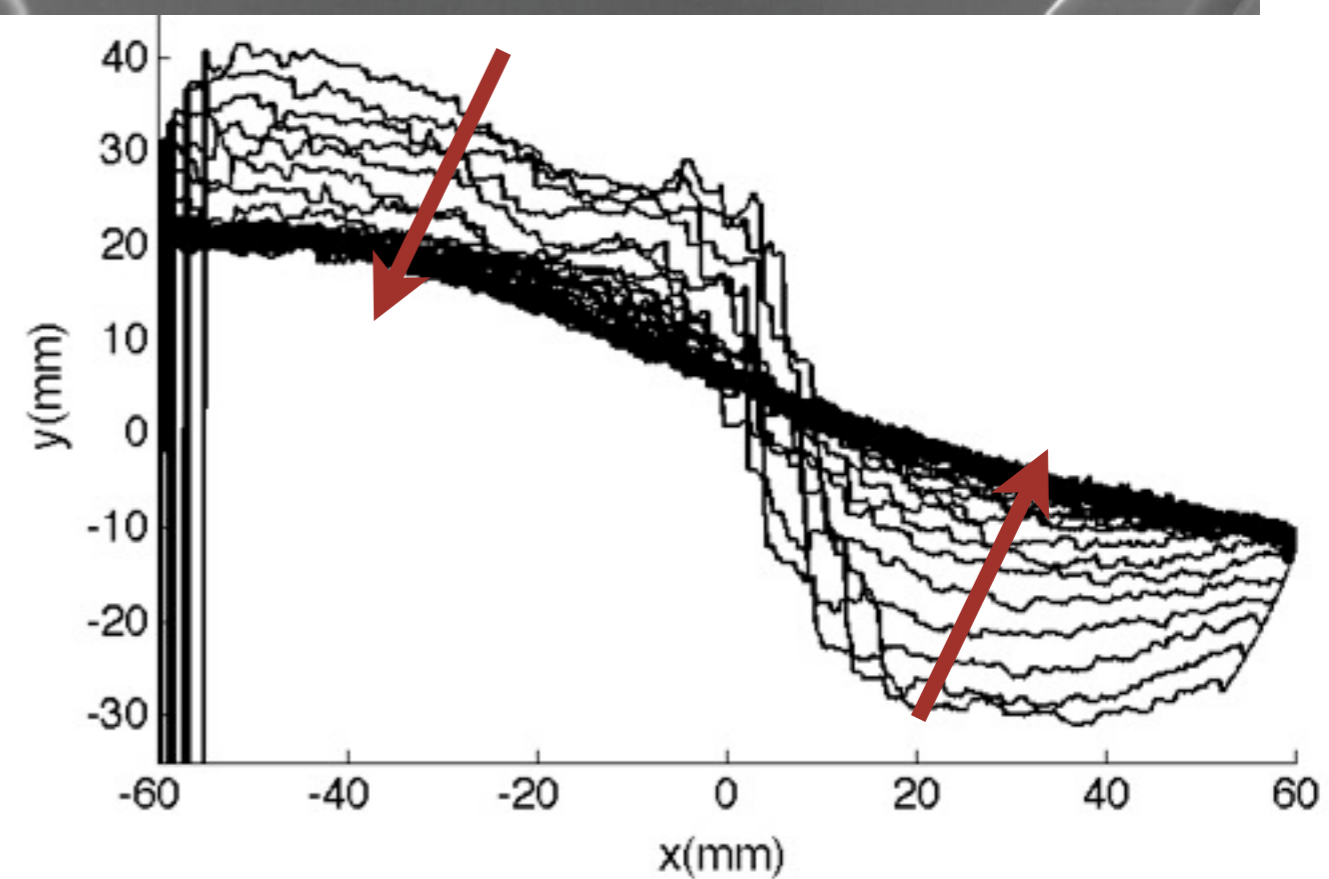
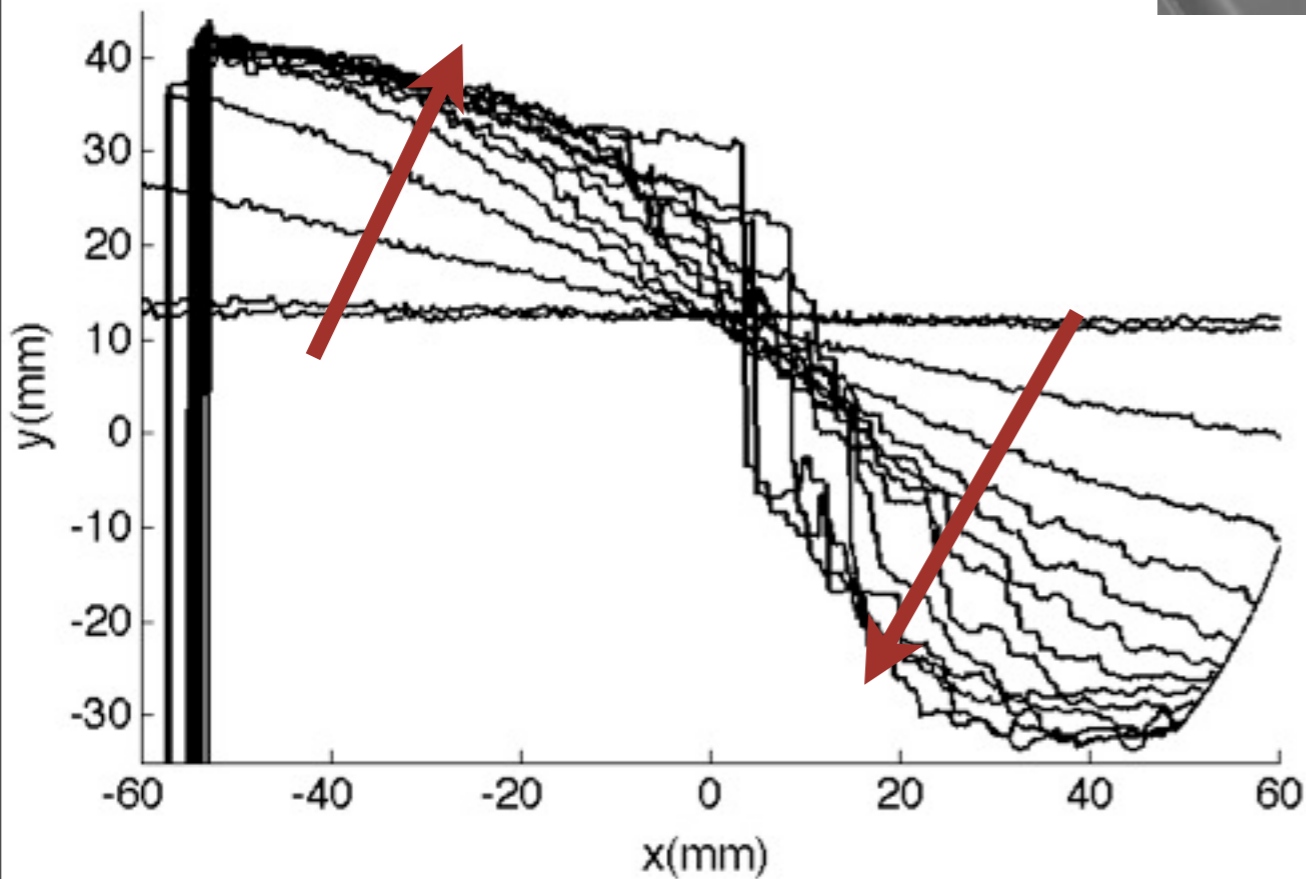
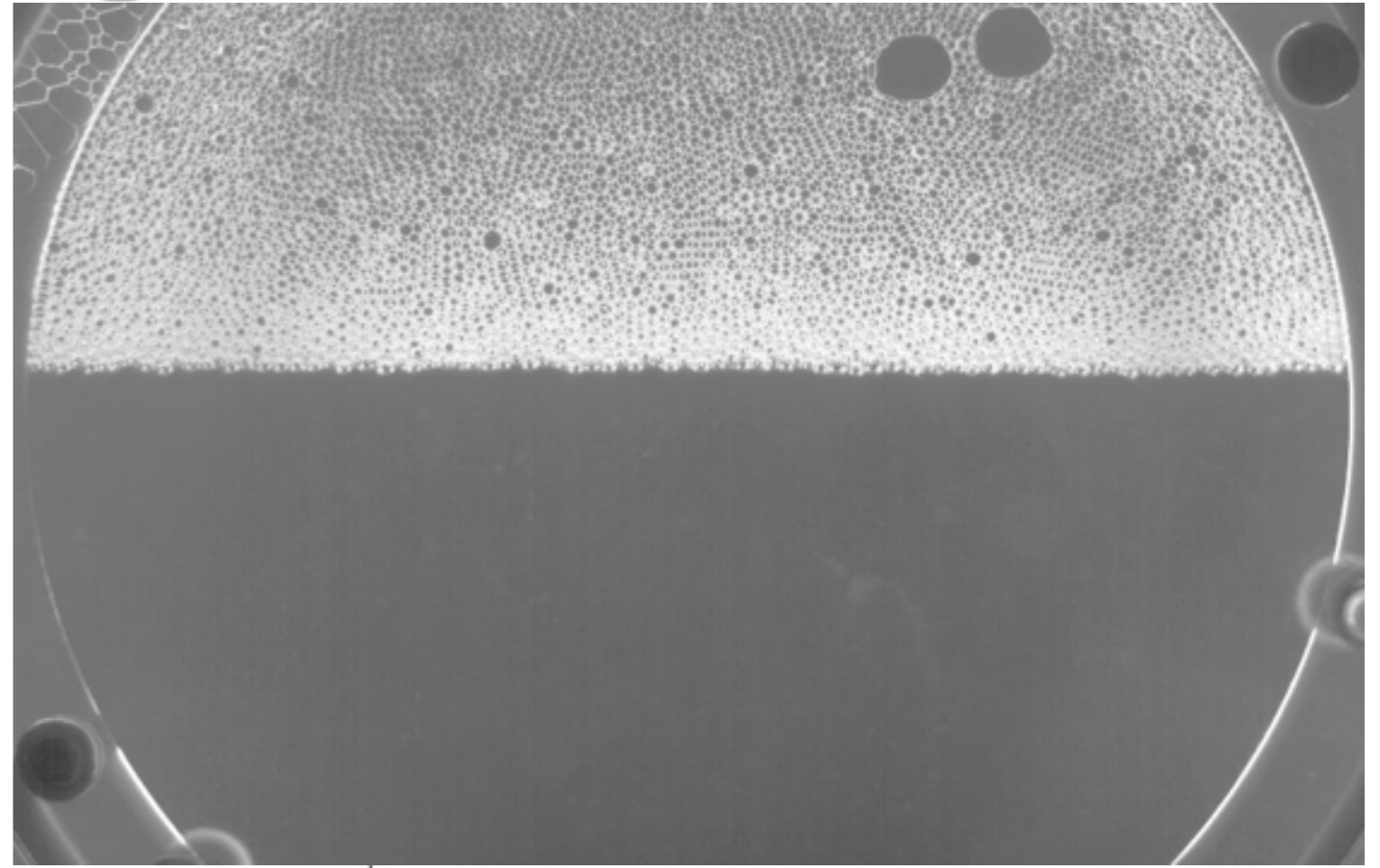
$\phi \simeq 0.55$



$\phi \simeq 0.80$

# Tambour: régime transitoire

$$\omega \simeq 2.6 \text{ rad/s}$$



# Paramètres



$\omega \simeq 0.17 \text{ rad/s}$

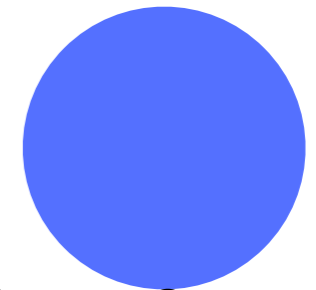
$\omega \simeq 2.6 \text{ rad/s}$



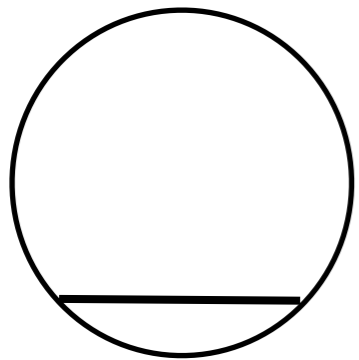
$D = 1 \text{ mm}$



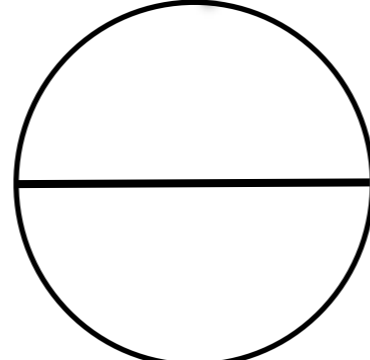
$D = 2 \text{ mm}$



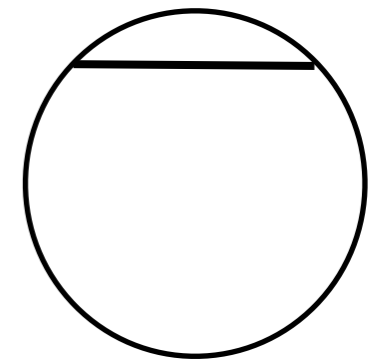
$D = 3 \text{ mm}$



$\phi \simeq 0.20$

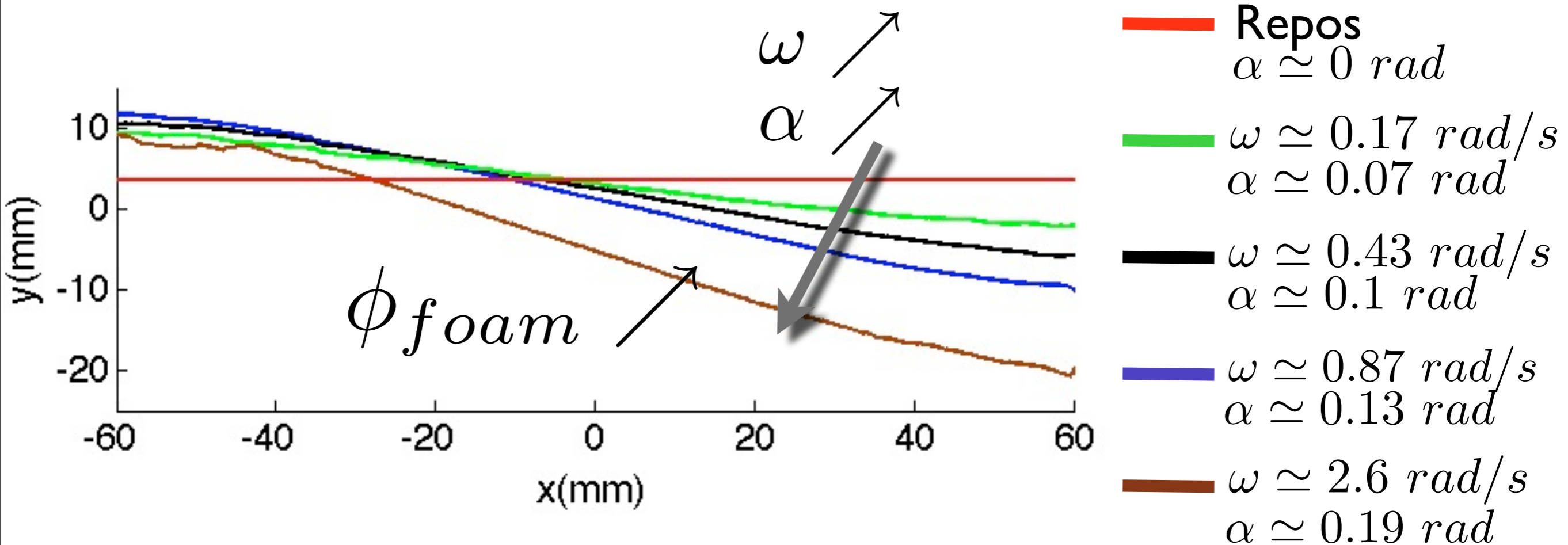
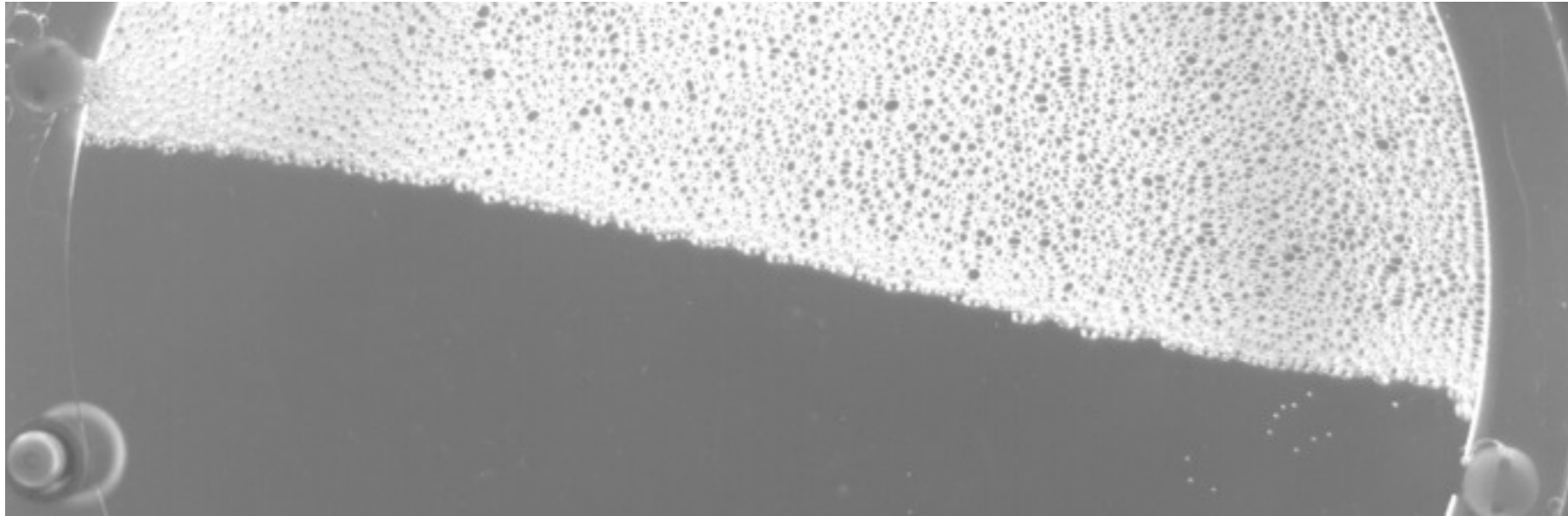


$\phi \simeq 0.55$

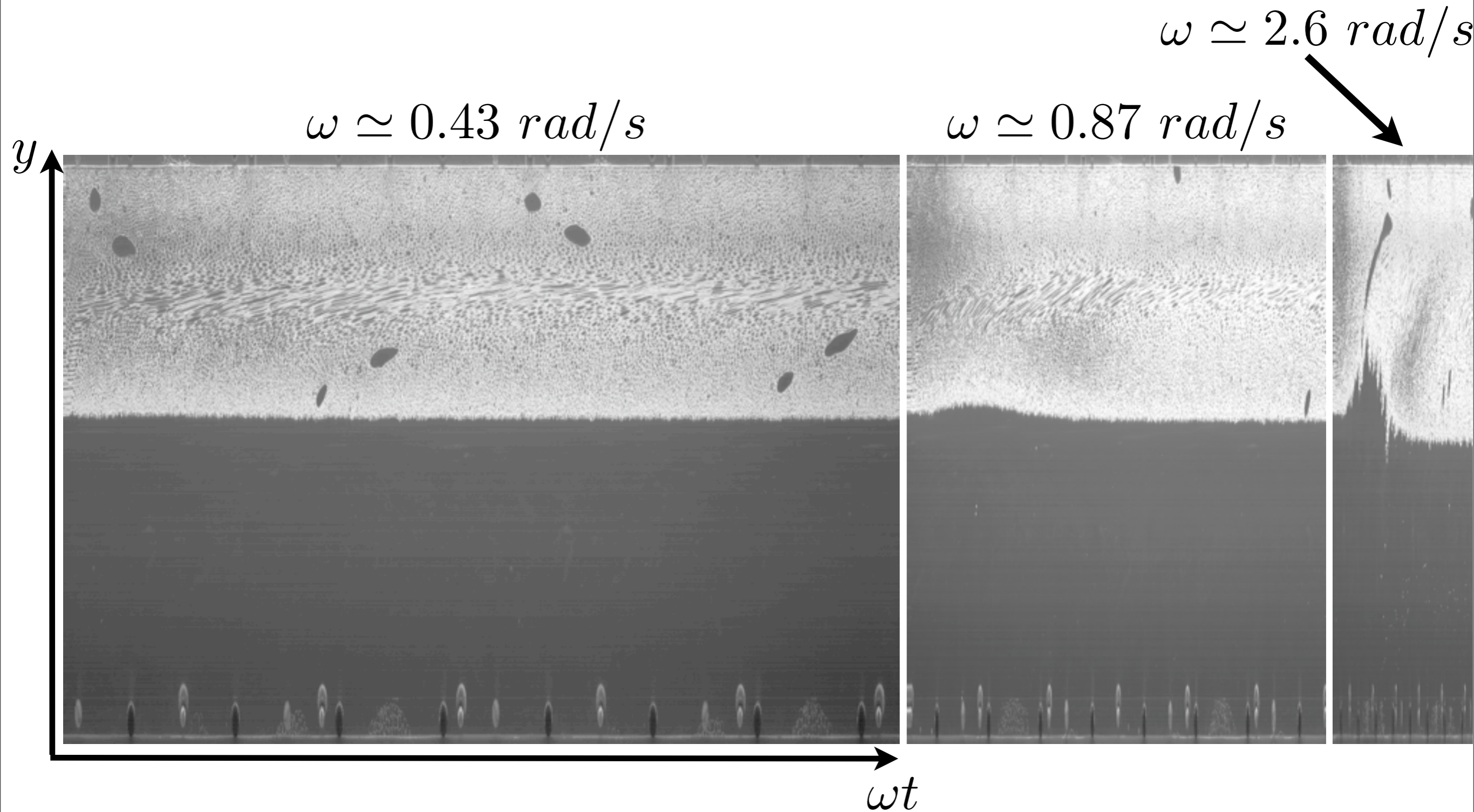


$\phi \simeq 0.80$

# Tambour: interface à l'équilibre



# Tambour: fraction de liquide



$$\omega t = 2$$

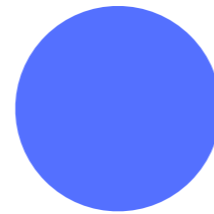
# Paramètres



$$\omega \simeq 0.17 \text{ rad/s}$$

$$\omega \simeq 0.87 \text{ rad/s}$$

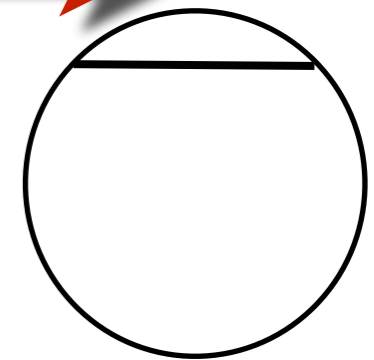
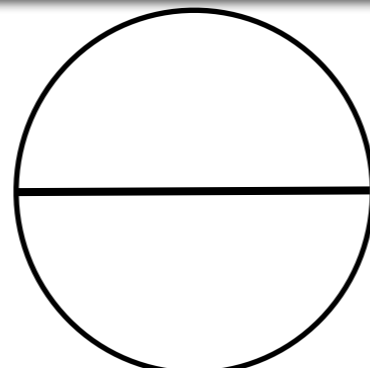
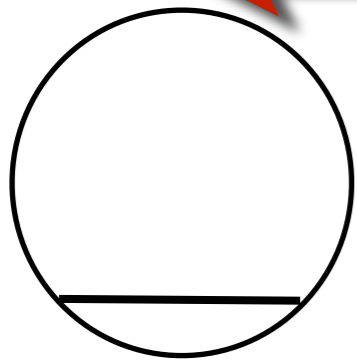
$$\omega \simeq 2.6 \text{ rad/s}$$



$$D = 1 \text{ mm}$$

$$D = 2 \text{ mm}$$

$$D = 3 \text{ mm}$$



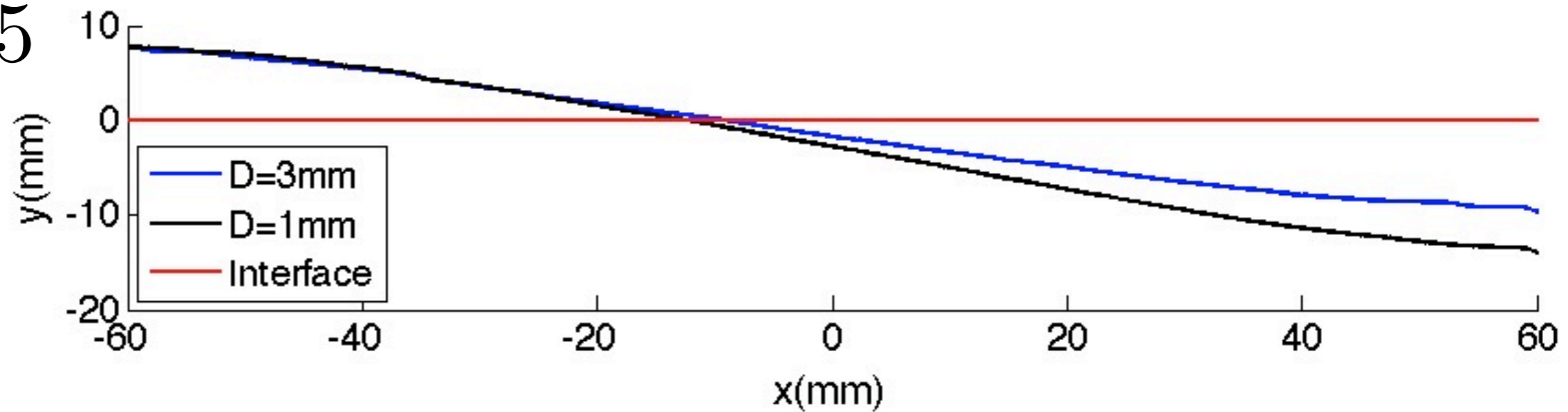
$$\phi \simeq 0.20$$

$$\phi \simeq 0.55$$

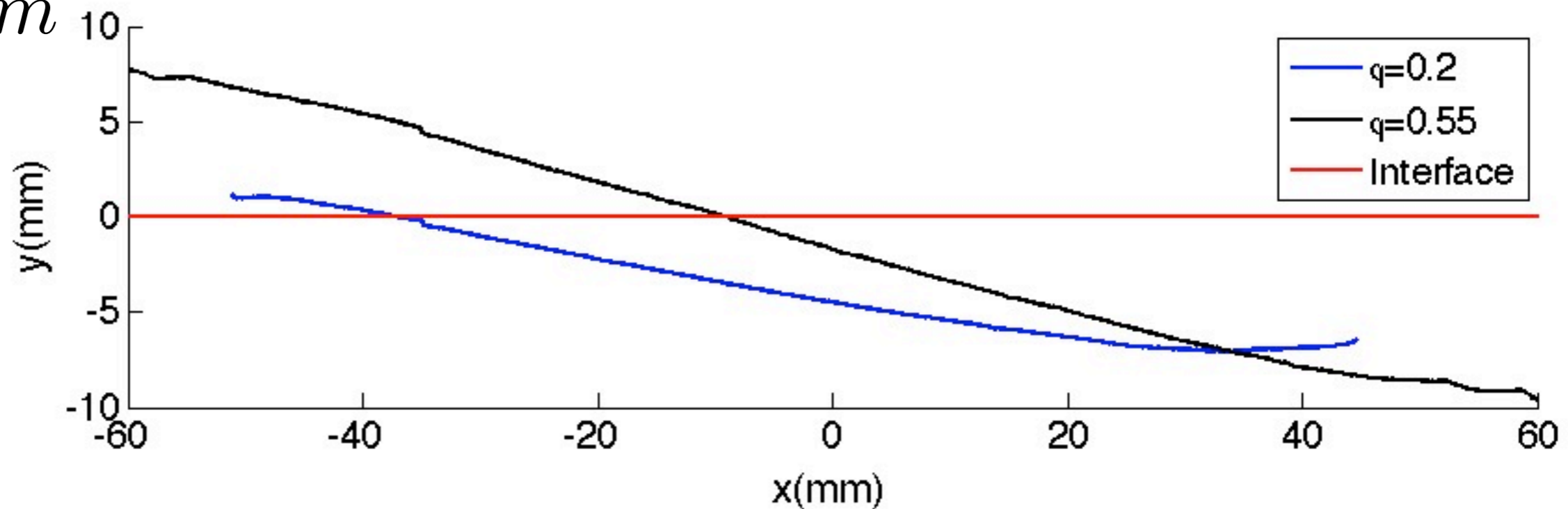
$$\phi \simeq 0.80$$

# Tambour: interface à l'équilibre

$$\phi \simeq 0.55$$



$$D = 3 \text{ mm}$$



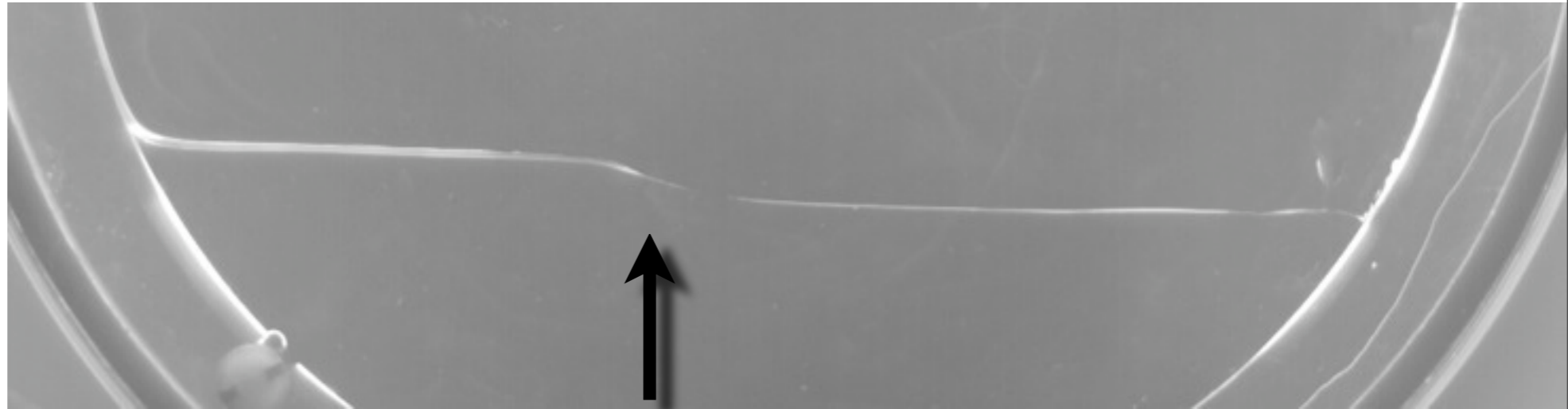
Interfaces centrées sur leur position au repos



# Tambour: surface libre

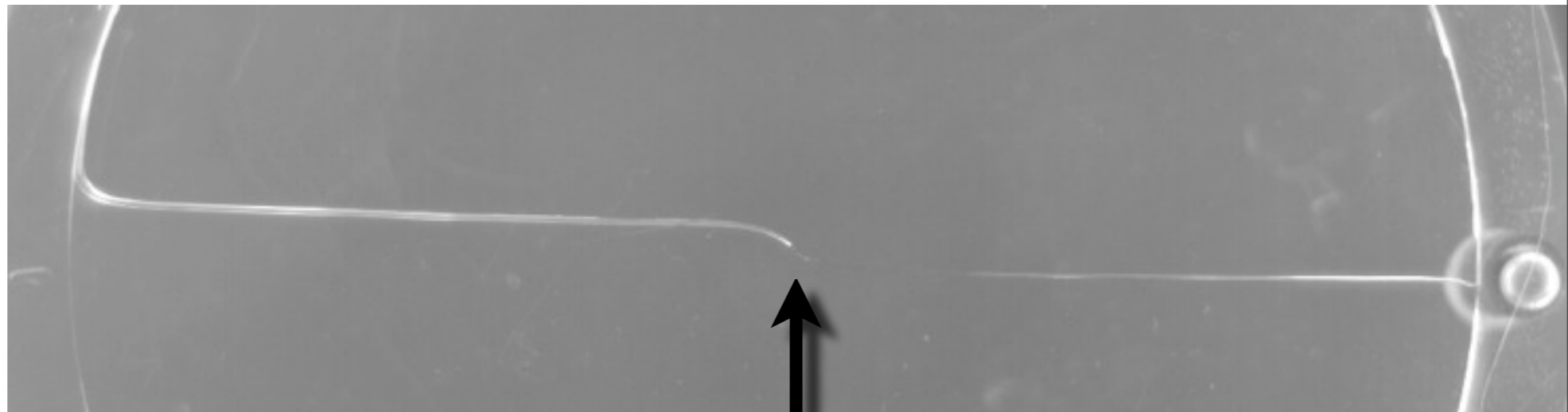
Surface à l'équilibre

$$\phi \simeq 0.25$$



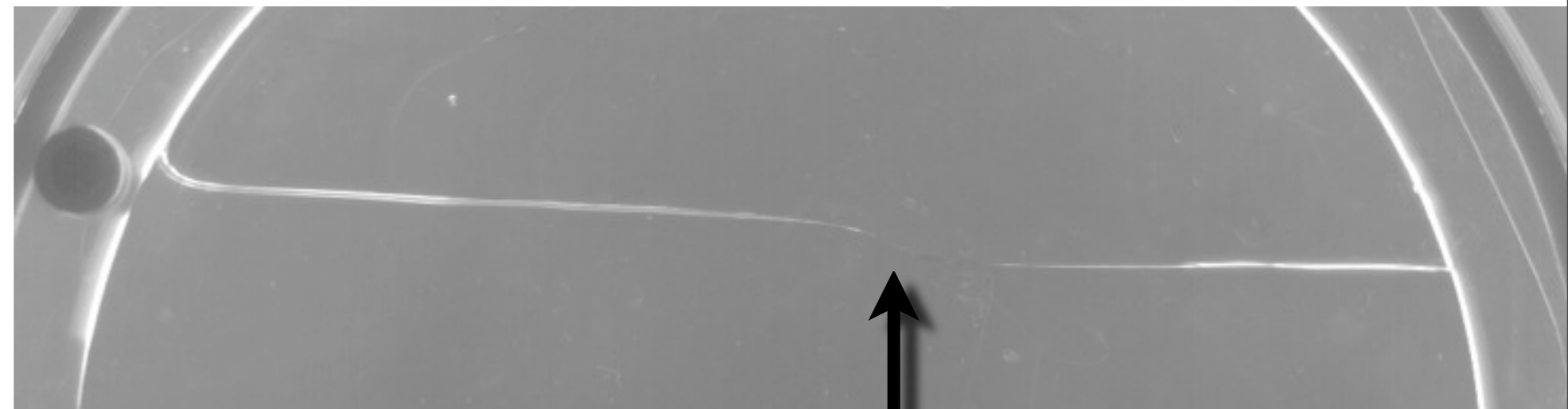
Surface à l'équilibre

$$\phi \simeq 0.5$$



Surface à l'équilibre

$$\phi \simeq 0.75$$



# Paramètres



$\omega \simeq 0.17 \text{ rad/s}$   $\omega \simeq 0.87 \text{ rad/s}$

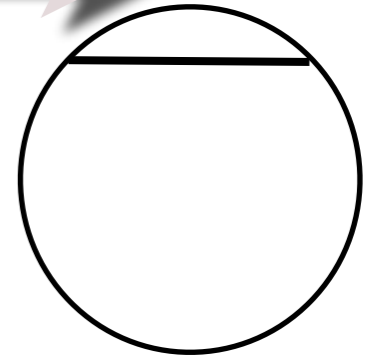
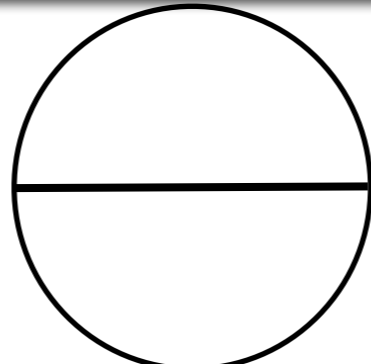
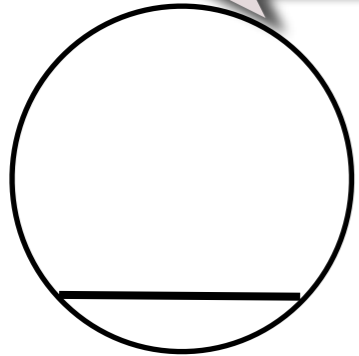
$\omega \simeq 2.6 \text{ rad/s}$



$D = 1 \text{ mm}$

$D = 2 \text{ mm}$

$D = 3 \text{ mm}$

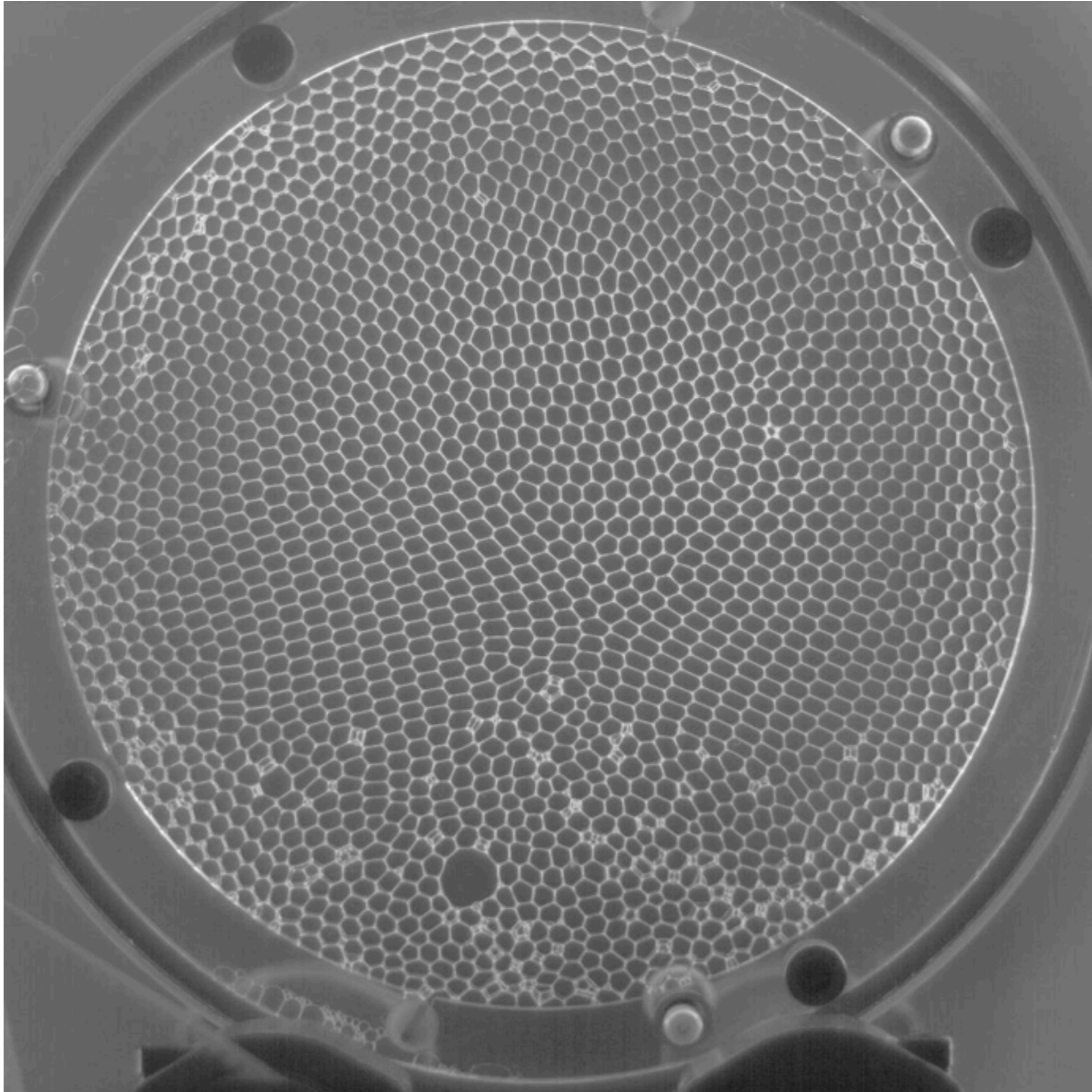


$\phi \simeq 0.20$

$\phi \simeq 0.55$

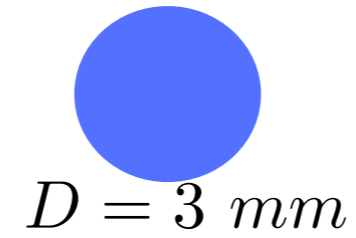
$\phi \simeq 0.80$

# ***Tambour: mousse sèche***



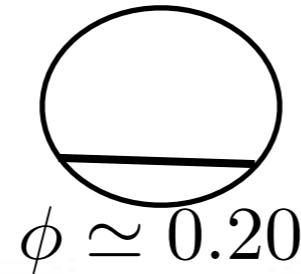
# Tambour: distribution de vitesses

$$t = 10^{-1} s$$

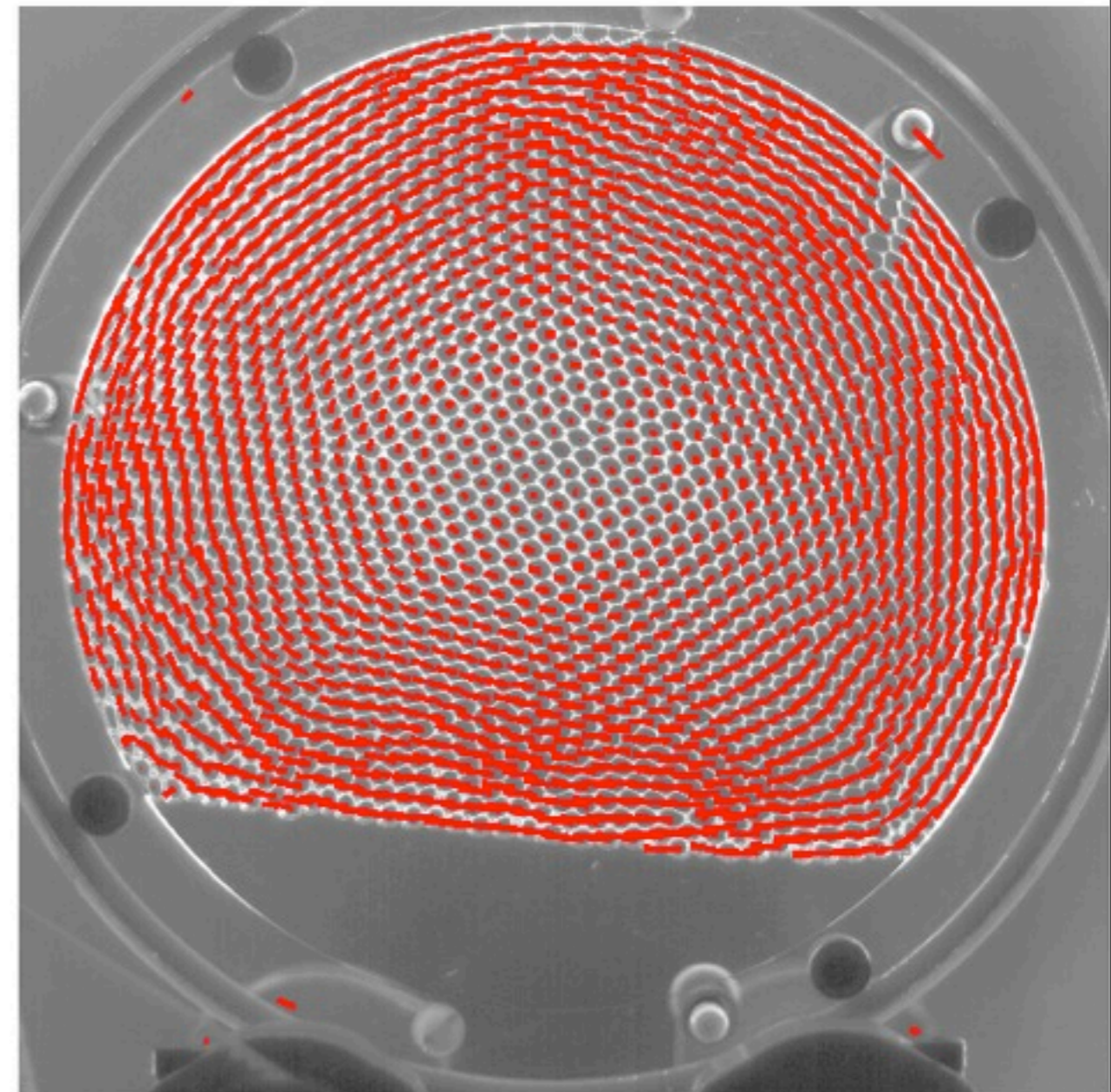
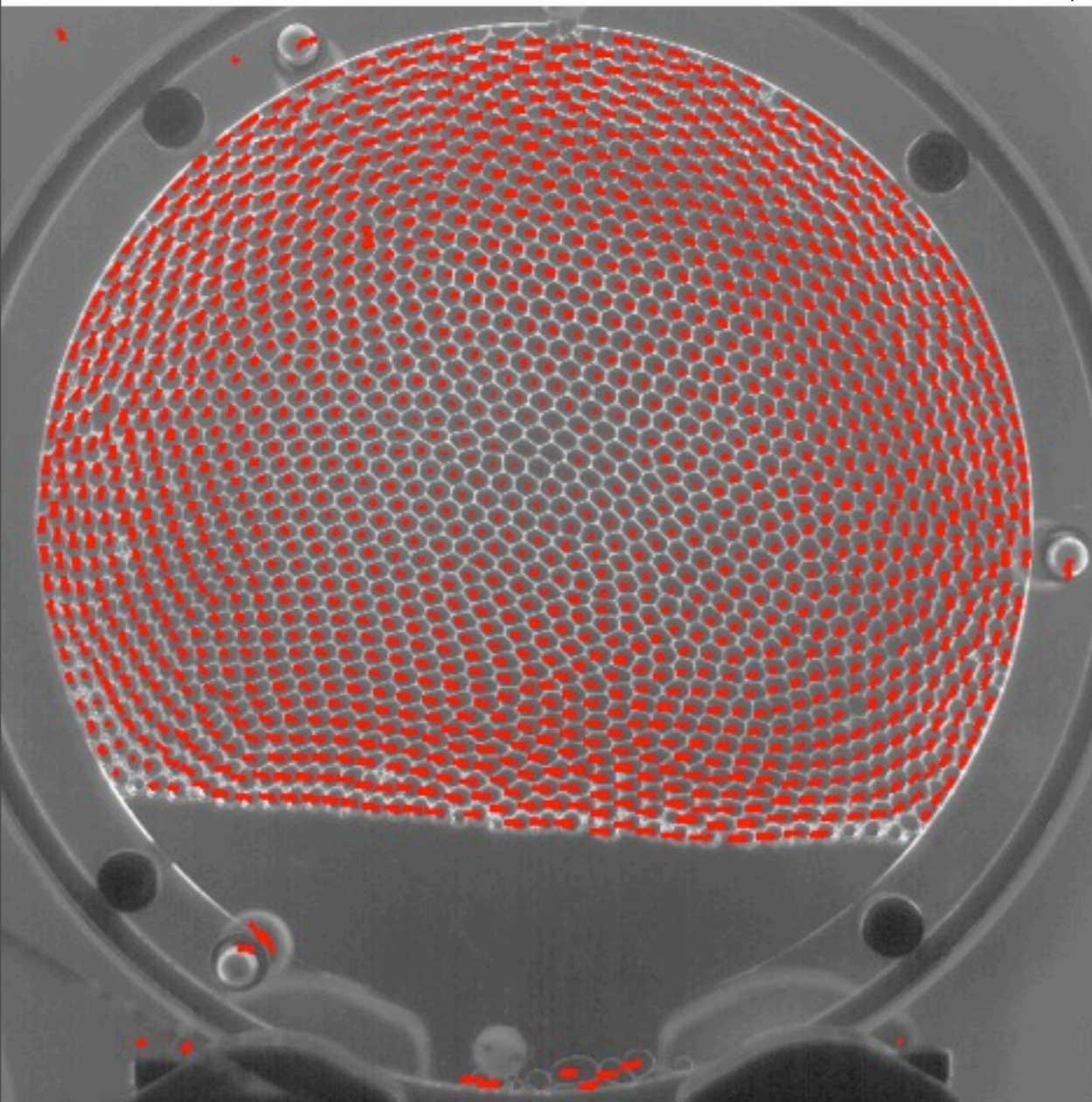


$$t = 10^{-1} s$$

$$\omega \simeq 0.43 \text{ rad/s}$$



$$\omega \simeq 0.87 \text{ rad/s}$$

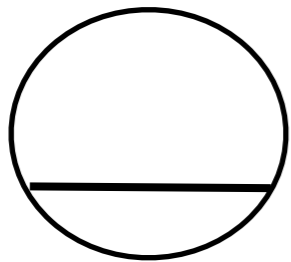


# Tambour: distribution de vitesses

$$\omega \simeq 2.6 \text{ rad/s}$$

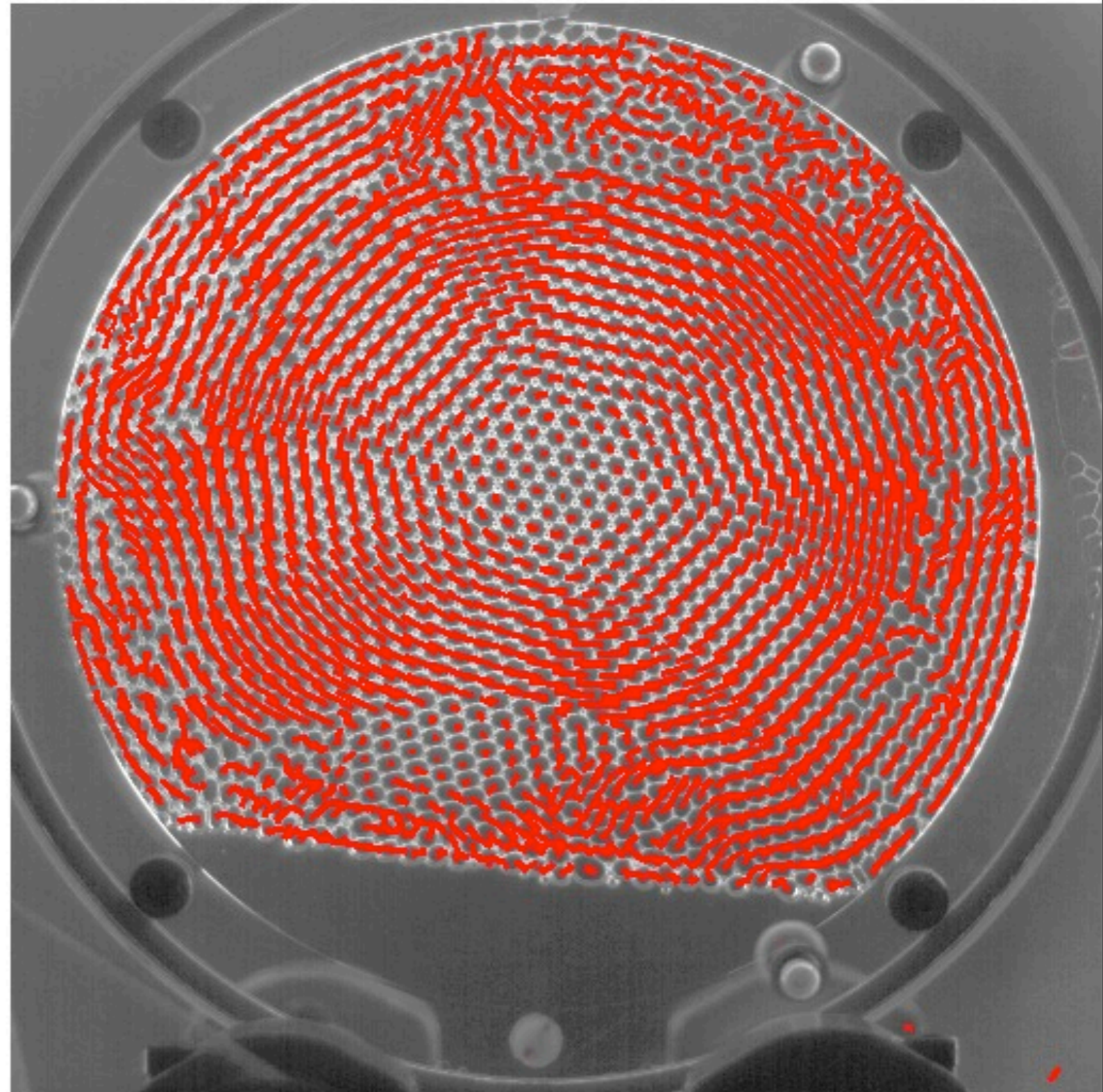


$$D = 3 \text{ mm}$$



$$\phi \simeq 0.20$$

$$t = 10^{-1} \text{ s}$$



# Paramètres



$\omega \simeq 0.17 \text{ rad/s}$   $\omega \simeq 0.87 \text{ rad/s}$

$\omega \simeq 2.6 \text{ rad/s}$



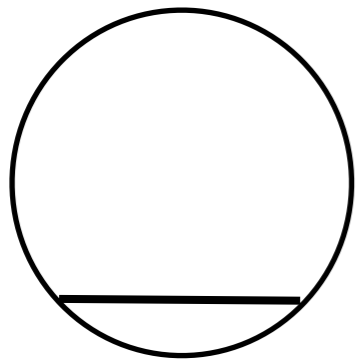
$D = 1 \text{ mm}$



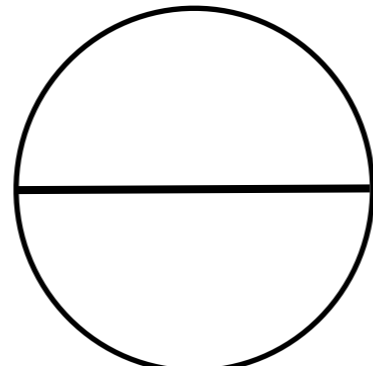
$D = 2 \text{ mm}$



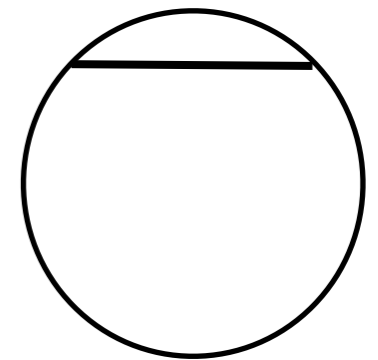
$D = 3 \text{ mm}$



$\phi \simeq 0.20$



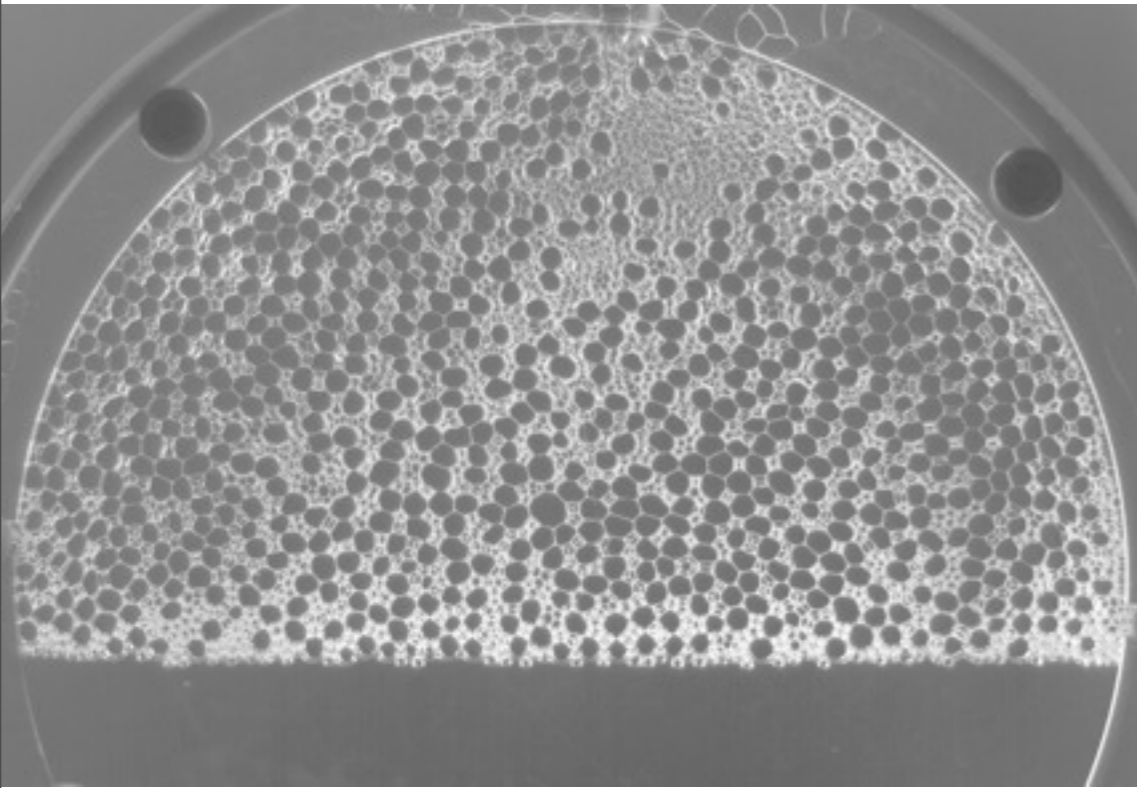
$\phi \simeq 0.55$



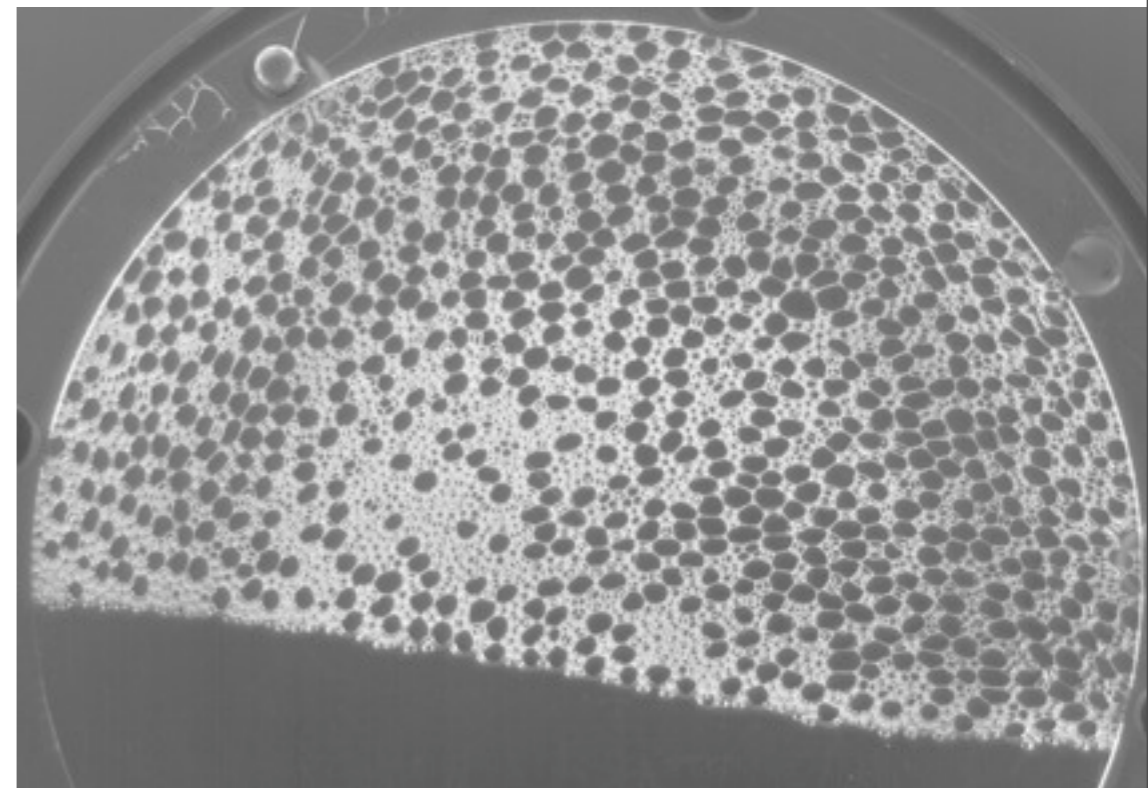
$\phi \simeq 0.80$

# Tambour: mousse bidisperse

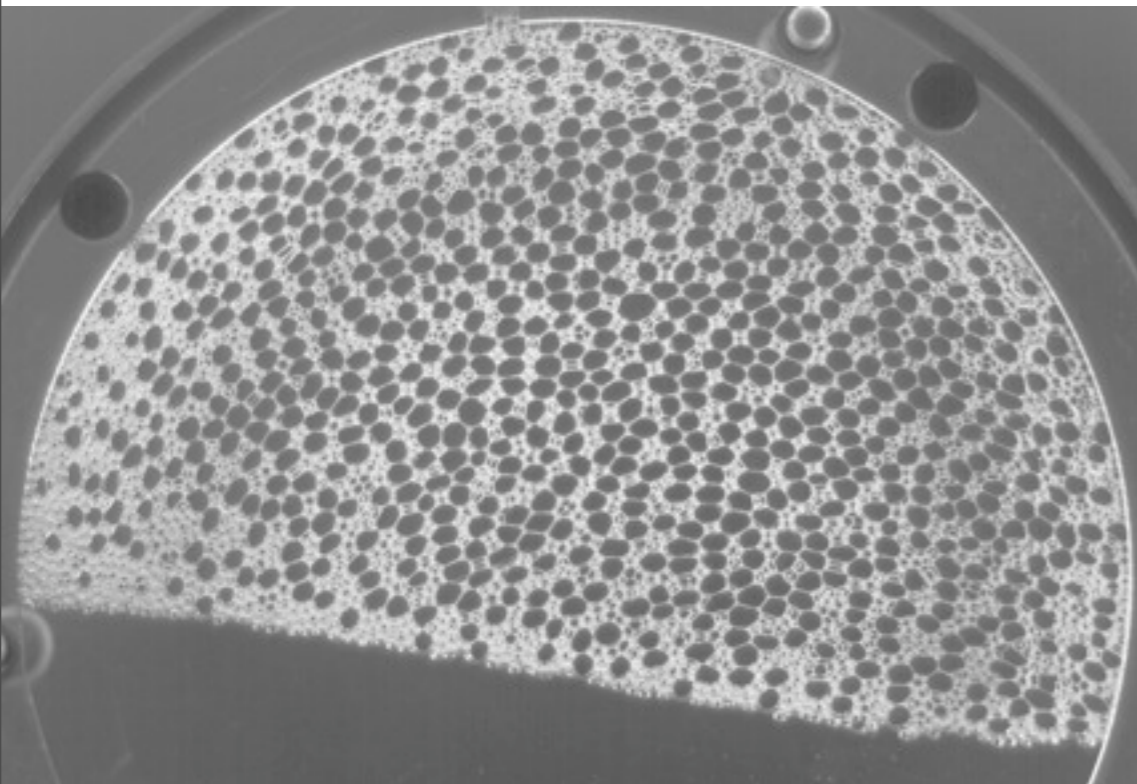
$t = 0s$



$t \simeq 60s$



$t \simeq 10min$



$t \simeq 1h$

