Goutte soufflée : croissance et dynamique d'une goutte cisaillée par un écoulement d'air

BESSENG A IREH Guy Raymond

Université Paul Sabatier

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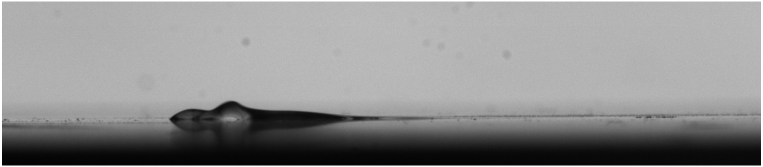
Introduction



Hypothèses

- Écoulement bidimensionnel, stationnaire
- $u \sim U$, $v \sim V$, $x \sim L$, $y \sim \delta$
- $\frac{\delta}{L} << 1$

$$\frac{\partial u}{\partial x} + \frac{\partial v}{\partial y} = 0 \tag{1}$$

$$u\frac{\partial u}{\partial x} + v\frac{\partial u}{\partial y} = -\frac{1}{\rho}\frac{\partial p}{\partial x} + \nu\frac{\partial^2 u}{\partial y^2} \tag{2}$$

$$\frac{\partial p}{\partial y} = 0 \tag{3}$$

Couche limite de Blasius

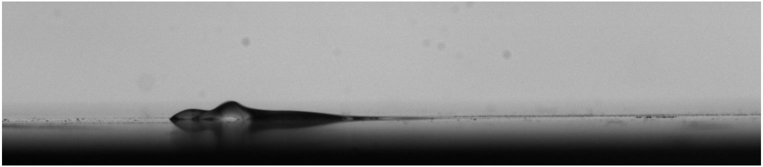
- Écoulement bidimensionnel, stationnaire
- $u \sim U$, $v \sim V$, $x \sim L$, $y \sim \delta$
- $\frac{\delta}{L} << 1$

$$\frac{\partial u}{\partial x} + \frac{\partial v}{\partial y} = 0 \tag{4}$$

$$u\frac{\partial u}{\partial x} + v\frac{\partial u}{\partial y} = -\frac{1}{\rho}\frac{\partial p}{\partial x} + \nu\frac{\partial^2 u}{\partial y^2} \tag{5}$$

$$\frac{\partial p}{\partial y} = 0 \tag{6}$$

Couche limite de Blasius



Résutats

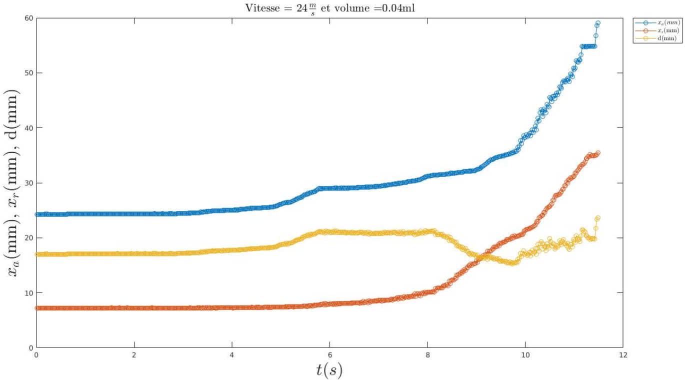


Figure – x_a, x_r, d, $U_\infty = 24m.s^{-1}$,
volume $=0.04ml$

Résutats

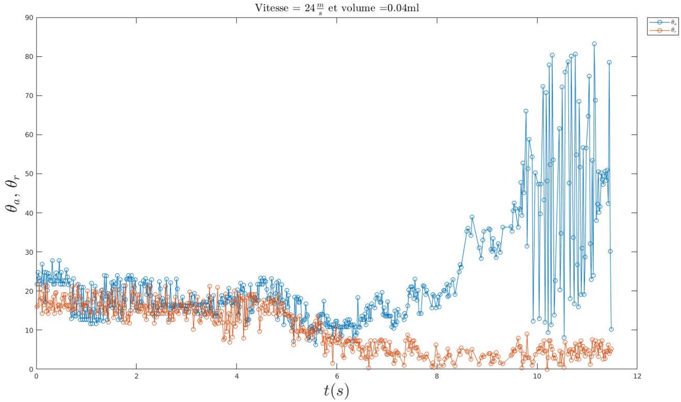


Figure – θ_a, θ_r, $U_\infty = 24m.s^{-1}$, volume =0.04ml

Résutats

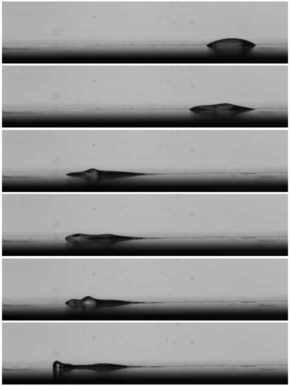


Figure – $U_\infty = 20 m.s^{-1}$, de haut en bas nous avons :
$t =\ 0s,\ 8s,\ 12.52s,\ 12.54s,\ 12.58s$

Résutats

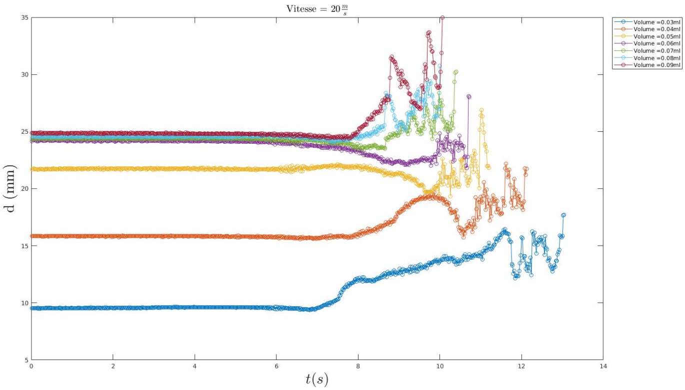


Figure – $d,\ U_\infty = 20m.s^{-1}$

Résutats

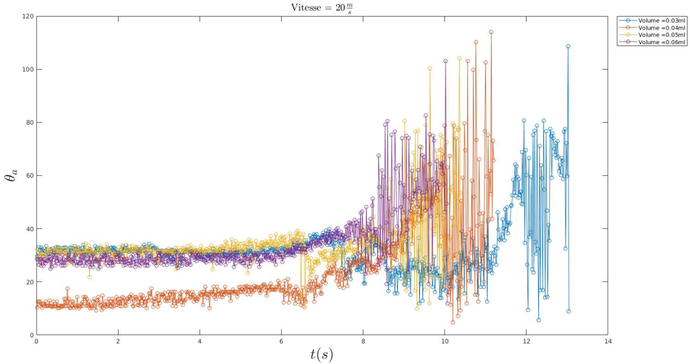


Figure – θ_a, $U_\infty = 20m.s^{-1}$

Résutats

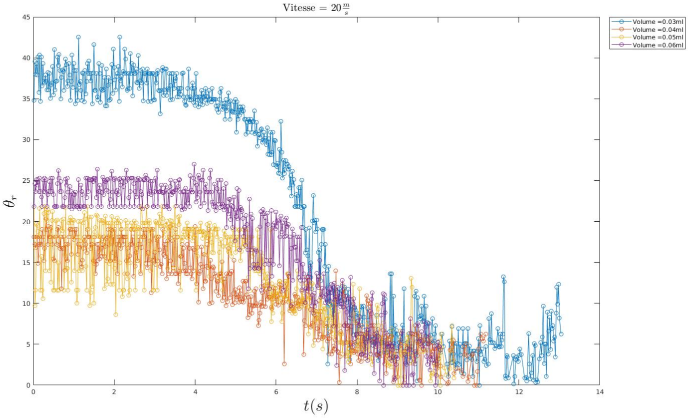


Figure – $\theta_r,\ U_\infty = 20 m.s^{-1}$

Questions

Avez-vous des questions ?