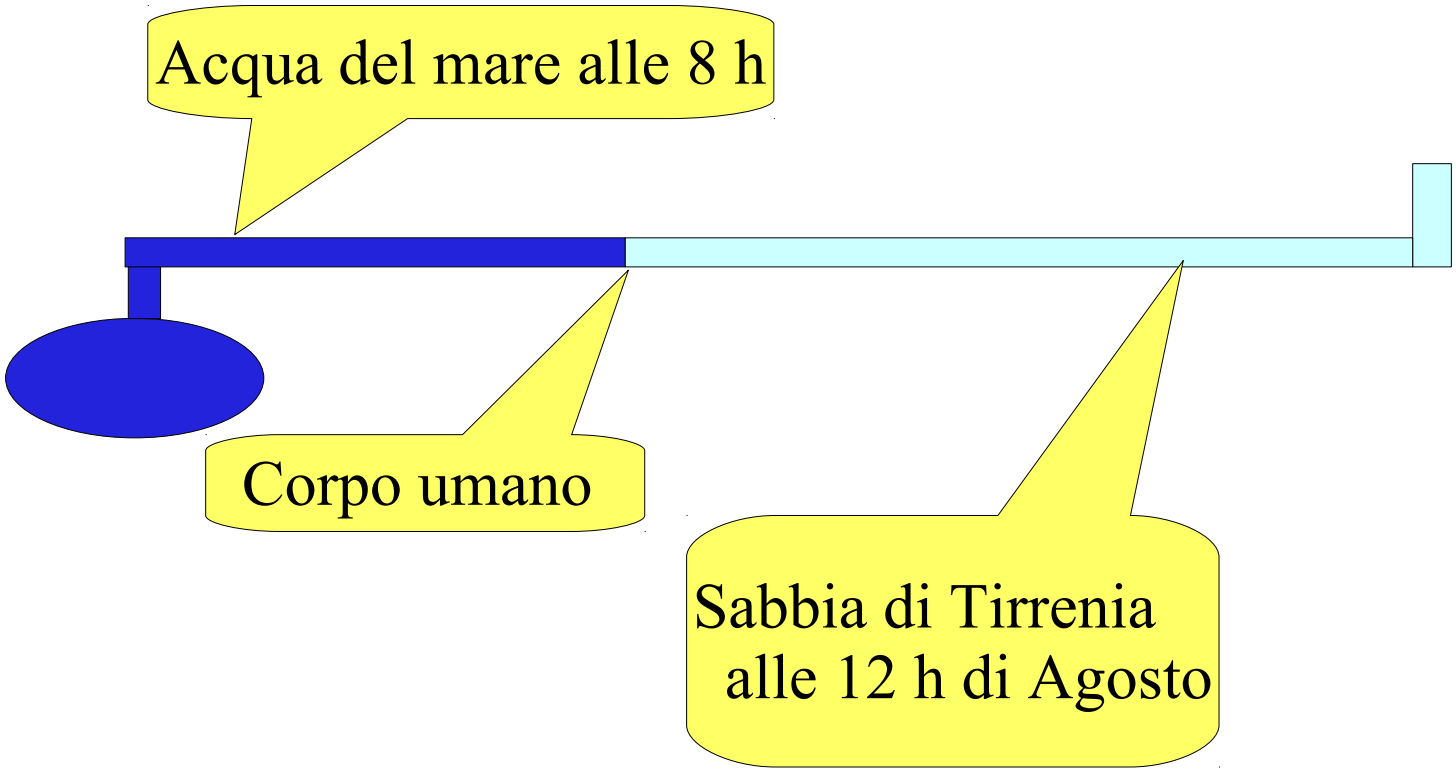
Termodinamica

Temperatura



Termodinamica

Temperatura

Legge di Gay_Lussac: *A pressione costante il volume di un gas "pefetto" varia linearmente con la temperatura, parimenti a volume costante la pressione varia linearmente con la temperatura.*

$$\frac{V - V_0}{v_0} = aC \qquad a = \frac{1}{273.15^0}$$

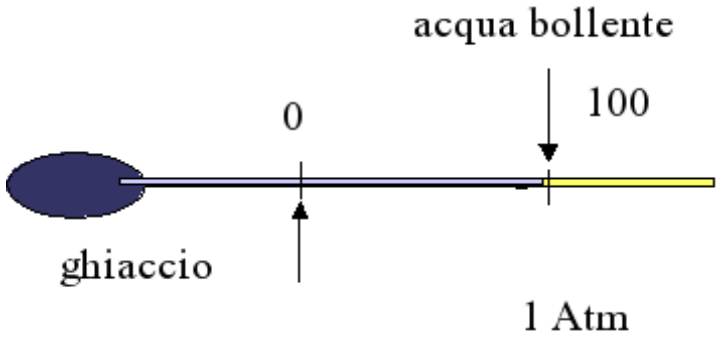
$$V = V_0(1 + aC)$$

taccapiu' bassaa

$$C = -273.15^0$$

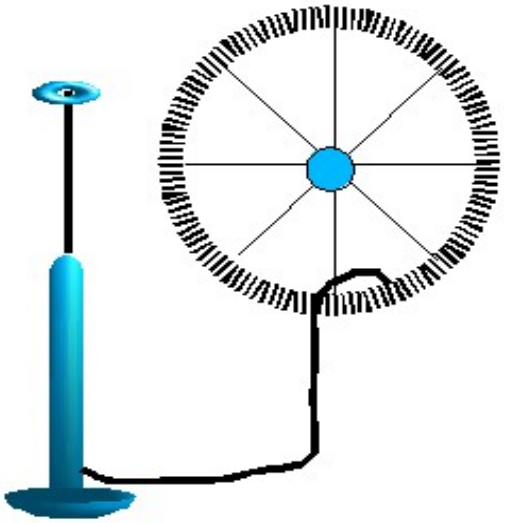
$$K = C + 273.15^0$$

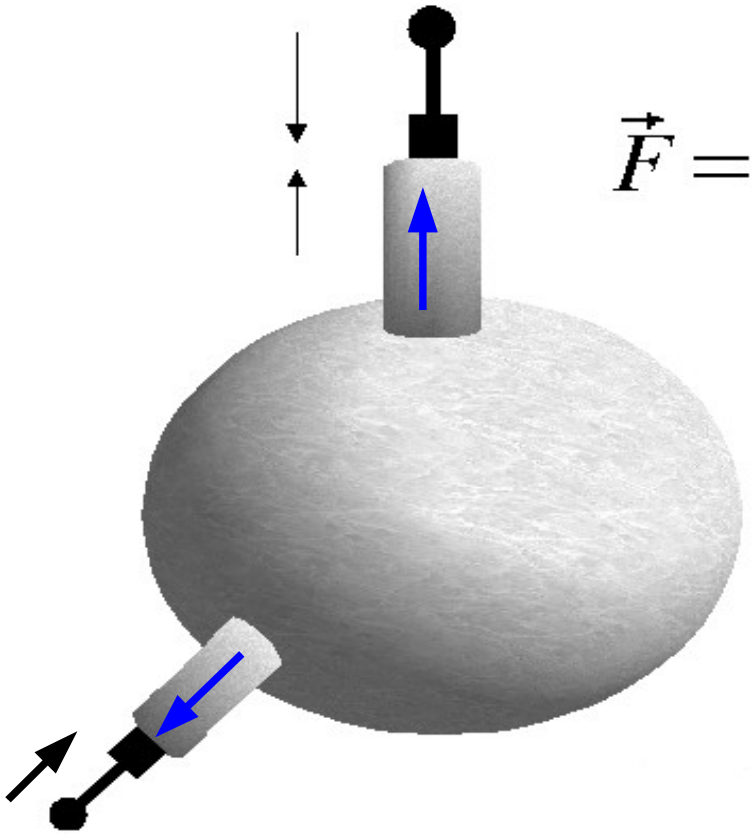
Puntatriplo $C = 0.01^0$



Termodinamica

Pressione





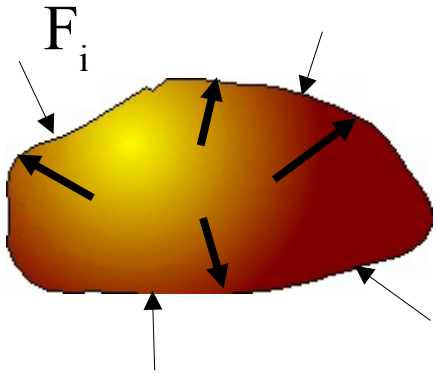
$$\vec{F} = P\,\sigma\,\vec{n}$$

Termodinamica

Pressione

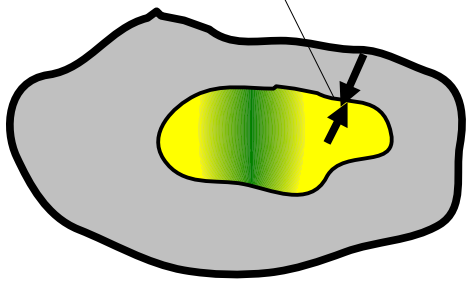
*Un fluido in **equilibrio** esercita su ogni parete del contenitore una forza diretta normalmente alla superficie e di modulo proporzionale all'area della parte considerata.*

Pascal



$$\vec{F} = P\,\sigma\,\vec{n}$$

P interna -esterna ?



coefficiente: detto “pressione”

Il Pascal

$$\vec{F} = P\,\sigma\,\vec{n}$$

$1\ \text{Pa} = 1\ \text{N}/\text{m}^2$

Bar $= 10^5$ Pa

Nota

La pressione atmosferica e'

$1\ \text{Kg/cm}^2 = 9.8\ /0.0001 \cong 10^5\ \text{N/m}^2$

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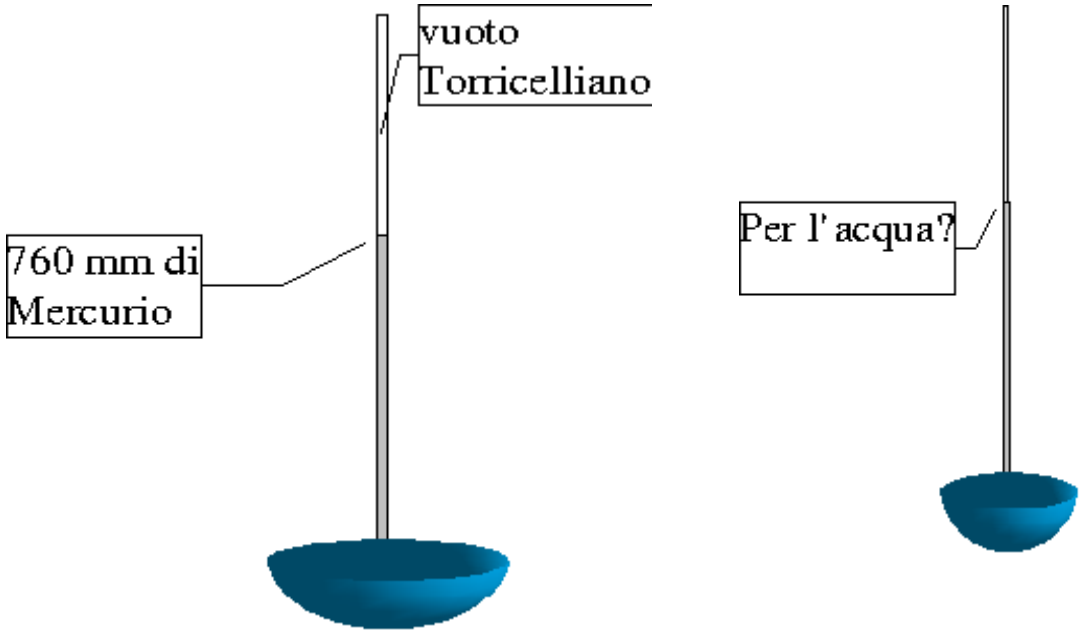
Pressione Atmosferica

$1\ \text{Atm} = 9.8 * .760 * 1.36\ 10^4\ \text{kg/m}^3 = 1.013\ 10^5\ \text{N/m}^2$

$1\ \text{Atm} = 1.013\ 10^5\ \text{Pa}$



torr =1 /760 Atm

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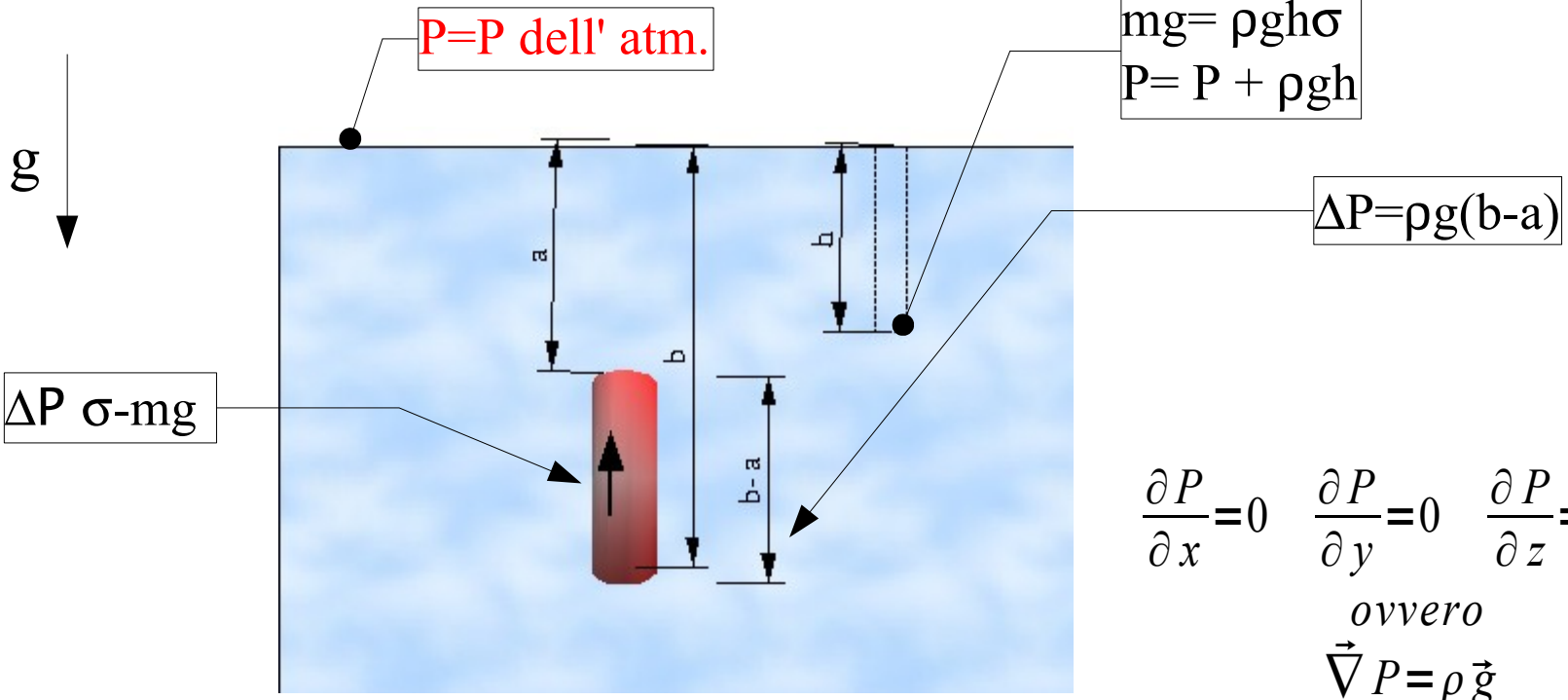
Forze a distanza - Archimede



$$\frac{\partial P}{\partial x}=0 \quad \frac{\partial P}{\partial y}=0 \quad \frac{\partial P}{\partial z}=-\rho g$$

ovvero

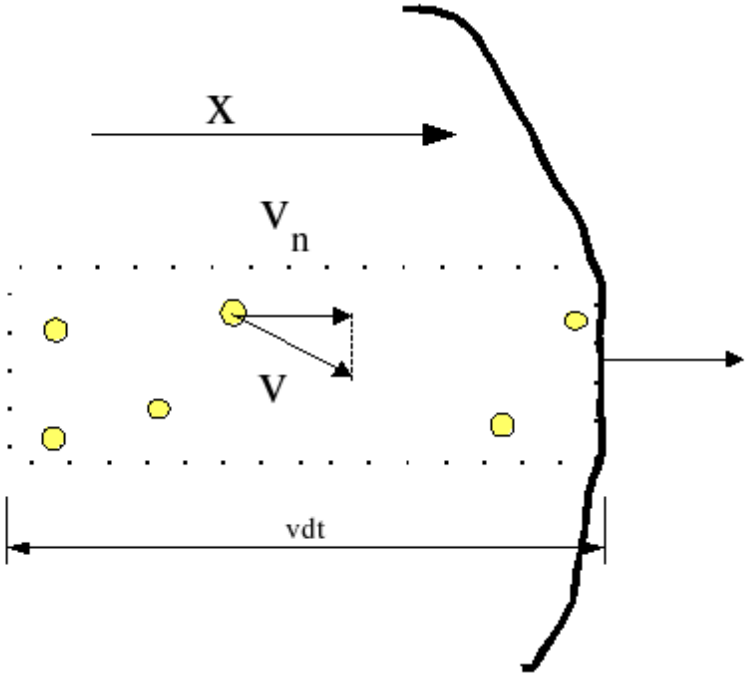
$$\vec{\nabla} P=\rho \vec{g}$$

La risultante delle forze che un fluido esercita su di u immerso e' uguale al peso del fluido spostato. (Archimede)

Termodinamica

Pressione

$$\Delta m v_n = 2 m v_x = f dt$$



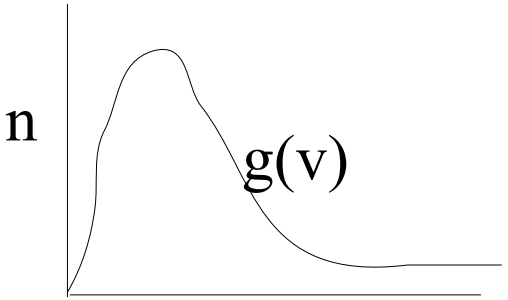
$$P\sigma = F_T$$

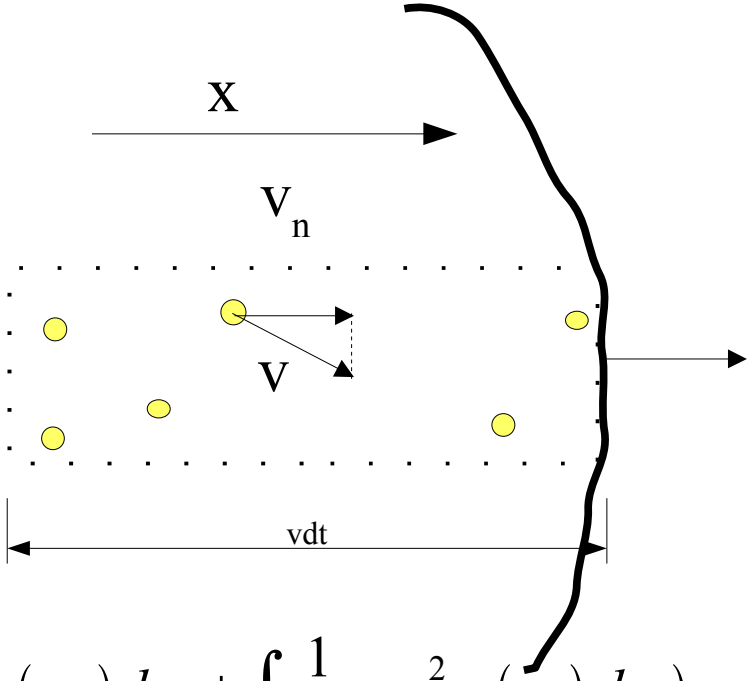
$$\Delta F dt = 2 m_x \frac{n_{v_x}}{2} = 2 m_n \frac{N_{v_x}}{2V} \Delta V = 2 m v_x \frac{N_{v_x}}{2V} \sigma v_x dt = 2m \frac{\bar{v_x^2}}{2V} \sigma dt N_{v_x}$$

Termodinamica

Pressione

$$P_x = P = 2\, m v_x^2 \frac{N_{v_x}}{2V} = \frac{2N_{v_x}}{V}\ \frac{1}{2} m v_x^2$$



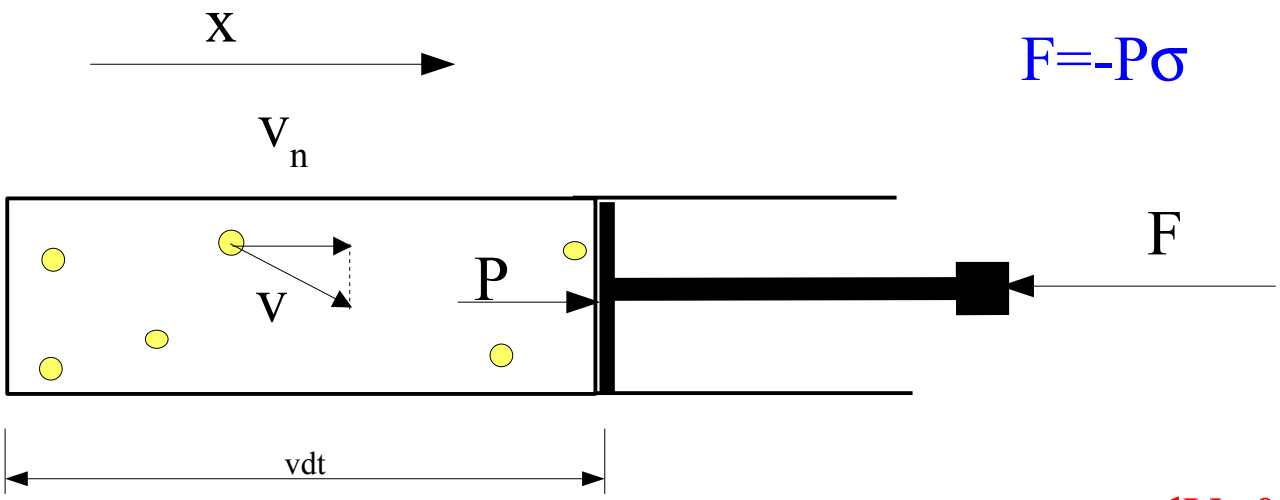


$$P = \frac{2}{3}\frac{N}{V}\left(\int_0^v \frac{1}{2} m v_x^2 \rho(v_x)\, dv_x + \int \frac{1}{2} m v_y^2 \rho(v_y)\, dv_y + \int \frac{1}{2} m v_z^2 \rho(v_z)\, dv_z\right)$$

$$P = \frac{2}{3}\frac{N}{V}\left(\overline{E_c}\right)$$

Termodinamica

Pressione e lavoro



$F = -P\sigma$

$$\vec{F}_e \cdot \vec{ds} = L = -\int P\, dV$$

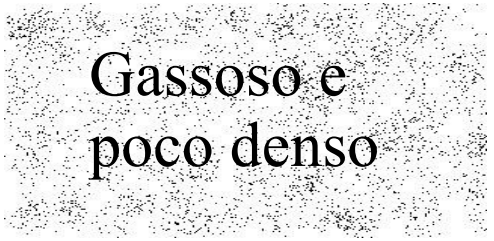
dV<0 ==> L>0

dV>0 ==> L<0

Materia: aggregato di molecole in interazione

-forza attrattiva a grande distanza
-forza repulsiva a breve distanza

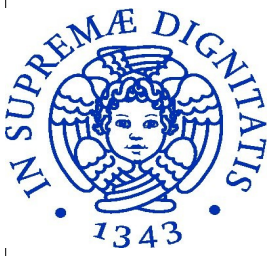
a T bassa media alta



Fluidi

cristallizzato

molecole libere



Termodinamica

note sui Fluidi

- *L'energia di interazione domina*:
  lo stato e' *solido*

- *L'energia termica (energia cinetica media) domina*:
  lo stato e' *gassoso*

- *Caso intermedio, energia di legame e termica confrontabili*:
  lo stato e' *liquido*

Sforzo di taglio?