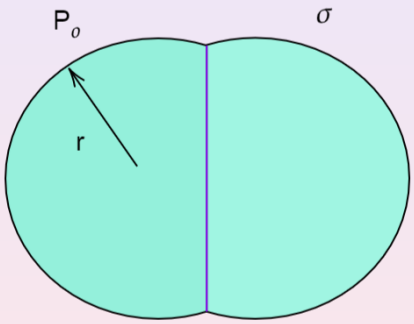
PLAYING WITH THE BUBBLE

QoTD 101 WEEK 13

CHALLENGE 01

Two soap bubbles with surface tension coefficient σ and radius r are separated from each other by a planar thin soap film that has same surface tension coefficient by puncturing this membrane we can achieve a isothermal union of 2 bubbles, if the radius of newly formed bubble is R.



Q1: (4 marks) Then what is normal atmospheric pressure P_o outside.

Q2: (5 marks) What is interval in r that R changes over?

Creator:- v€çtørqûårk

DRUNKEN ATOM

QoTD 105 WEEK 13

CHALLENGE 05

The potential energy of an atom in some crystal is described by the formula

$$U(r) = U_\circ\left(\left(\frac{r_\circ}{r}\right)^{12} - 2\left(\frac{r}{r_\circ}\right)^{6}\right),$$

where $U_\circ = 8.8 \times 10^{-4}$ eV and $r_\circ = 0.287$ nm corresponds to the equilibrium position of the atom.
For small deviation from the equilibrium position, oscillation occur.
According to quantum concepts, the energy of oscillation with a frequency $\omega = 2\pi\nu$ can take values $E_n = h\nu\left(n + \frac{1}{2}\right)$, $n = 0, 1, 2, \ldots$, where $h = 6.62 \times 10^{-34}$ J $\cdot$ s is Planck's constant.

Q1: (12 marks) Estimate the smallest amplitude $\chi_\circ$ oscillations of the displacement of an atom in such a crystal.

[Mass of an atom $m = 6.4 \times 10^{-24}$ g; 1 eV $= 1.6 \times 10^{-19}$ J]

Creator:- JØKÊR

QoTD 54 WEEK 7

CHALLENGE 4

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Creator:- Anonymous