

### Answer on Question #74978-Physics-Mechanics-Relativity

The pressure  $P$  of an ideal of gas in p is given by the equation  $P=1/3\rho C^2$  where  $\langle C^2 \rangle$  is the mean squared speed and its measured as  $[\text{speed}]^2$ . Use the base units to show that the equation is homogeneous.

#### Solution

$$[P] = \frac{N}{m^2} = \frac{kg \frac{m}{s^2}}{m^2} = kg m^{-1} s^{-2}.$$

$$\left[ \frac{1}{3} \rho C^2 \right] = \left[ \frac{1}{3} \right] [\rho][C^2] = 1 \left( \frac{kg}{m^3} \right) \left( \frac{m^2}{s^2} \right) = kg m^{-1} s^{-2}$$

Thus,

$$[P] = \left[ \frac{1}{3} \rho C^2 \right]$$

So, the equation is homogeneous.

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