12.10.11

EE23BTECH11022 - G DILIP REDDY

Question:
The 6563 Å Hα line emitted by hydrogen in a star is found to be redshifted by 15 Å. Estimate the speed with which the star is receding from the Earth.

Solution:

Variable	Description	Value
λ	Wavelength of emitted line	6563 Å
$\Delta\lambda$	Red shift	15 Å
c	Speed of light	$3\times10^{8} m/s$
v	Speed of star	

TABLE I: Variables Used

$$\frac{v}{c} = \frac{\Delta\lambda}{\lambda_0} \tag{1}$$

$$v = \left(\frac{\Delta\lambda}{\lambda_0}\right)c \tag{2}$$

$$v = \left(\frac{15\times10^{-10}}{6563\times10^{-10}}\right)\left(3\times10^{8}\right) \tag{3}$$

$$\implies v = 6.86\times10^{5} m/s \tag{4}$$