

Solutions

2.1 A Compare a identified line with its laboratory rest wavelength. Use $z = (\text{observed} - \text{rest})/\text{rest}$, then v approximately cz in the stated low-speed model. Do not apply this approximation without checking the regime or treating a cosmological redshift as a simple exact velocity.

2.2 $z = (601.2 - 600)/600 = 0.002$.

2.3 False. The approximate shift relation does not show that light travels faster from an approaching source. A single unidentified line cannot safely establish a redshift.

2.4 redshift. redshift means Shift of an identified line toward longer wavelength.

3.1 $z = -0.002$; $v \approx cz = -6 \times 10^5$ m/s, approaching under the positive-away convention. This small- $|z|$ kinematic approximation does not cover every origin of redshift.