

Redshift / Blueshift HO



Station 1: Historic Galaxy Spectra

Read the article describing how to interpret the spectra images. Once you have done so, please use the spectra images to answer the questions below.

1. Explain what astronomers measure in each spectra to determine the direction and speed of the galaxy.

The laboratory ^{measure} they would the shift in wavelength from frame.

2. Given your knowledge of the images, which colors of the rainbow must be on the left and right sides of the spectra?

red is on the right blue is left.

3. As galaxies have more and more redshift, how would you expect their velocities to change?

The velocity would be higher because of red shift.

4. The top galaxy spectrum is quite thick and they get progressively thinner as you go down the page. What do you think is the cause of the different galaxy spectra thicknesses?

The longer a wave length is the more stretched out it is.

Station 2: Calculating the Velocities of Galaxies

Use the spectra and instructions at the station handout to fill out the table below and calculate how fast these galaxies are moving **and** which direction they are moving.

Galaxy Spectral Shift Table				
Galaxy	Hydrogen Spectral Line Location (nm)	Wavelength Shift (nm)	Velocity (km/s)	Direction (Away or Closer)
Virgo A	658.9 nm	2.9	1,326.2	away
M65 Spiral in Leo	657.9 nm	1.9	868.9	away
Andromeda	655.2	-0.5	-228 km/s	close
Human Eye	1 nm	1 nm	457 km/s	--

Station 3: Redshifting Galaxies from Universe Expansion

Galaxy	Redshift (km/s)	Distance (Mpc)	Distance in lightyears
A	2500	38.7 Mpc	126,356,589.1
B	13500	209.3 Mpc	682,325,581.4
C	3900	60.4 Mpc	197,116,279.1
D	7400	114.7 Mpc	374,015,503.9
E	9600	148.8	485,209,302.3

Step 3: How far does an object need to be in order for Universal Expansion to be visible to the human eye?

35.3 Mpc

Step 4: Can we use telescopes to see stars affected by Universal Expansion?

No its too far.

Station 4: Finding Exo-planets through Redshift - Blueshift

After reading the article online, please work together as a small group to answer the questions below.

1. What causes the redshift and blueshift in the radial velocity method?

The Stars motion makes it blue or red...
gravity tugging on planet

2. What is an exoplanet?

any planet outside the solar system

3. What are two advantages of the Radial Velocity Method?

two advantages are that it can identify hundreds of far away worlds and it doesn't require space telescopes

4. Using the blue graph, what do you think is the Period of the 51 Pegasi exoplanet?

4.231 days

5. What are two disadvantages of the Radial Velocity Method?

can't determine the mass of the planet and it finds planets not able to inhabit life

