

AST 301
Homework #11
Due Friday April 29

1. Do you care whether the Universe expands forever or eventually is pulled back together in a 'big crunch'? Write a brief essay (1/2 page is plenty) saying why you do or don't care about the fate of the Universe.

2. Jupiter orbits the Sun at a speed of about 13 km/s. The force of the Sun's gravity on Jupiter is equal to the force of Jupiter's gravity on the Sun, but since the Sun is about 1000 times more massive than Jupiter, the force has 1000 times less effect on the Sun, so Jupiter causes only a 13 m/s (rather than km/s) motion of the Sun.

Imagine an astronomer on a planet around another star measured the Doppler shift of the Sun. To be specific, imagine that astronomer measured the wavelength of the hydrogen line that is emitted at a wavelength of 656.3 nm.

What wavelength would that astronomer measure when the Sun is moving toward her at 13 m/s? What wavelength would she measure when the Sun is moving away from her at 13 m/s six years later?

Comment on whether she would find it difficult to measure this Doppler shift. (You haven't learned about how difficult it is to measure a wavelength accurately, but you can probably make a reasonable guess.)