## exp_hubble_linearNote guide for Expanding Space

**Olber’s Paradox**

Were the universe infinite in age and size…

**Red Shift of the “spiral nebulae” -**

|  |  |
| --- | --- |
| Approximate Redshift   Δλ = Amount the wavelength shifts (longer)  λ = Original wavelength  v = Recession velocity  c = 3.00x108 m/s  (The real formula – not in data packet)    λ’ = Red shifted wavelength  λ = Original wavelength | **Example:** What is the change in wavelength of the 656 nm line of a galaxy receding at 20,000 km/s? What is the new wavelength? |
| Hubble’s law   H = Hubble’s constant (71 ± 2 km/s/Mpc)  d = Distance to object in Mega parsecs.  v = Recession velocity  Calculates the rate an object recedes from us due to the expansion of the Universe based on its distance from us | **Example:** What is the distance to a galaxy that has a 480 nm line that comes in at 497 nm? |
| **Example:** Estimate the age of the universe from the a Hubble constant of 71 km/s/MPc  (1 ly = 9.46x1012 km, 1 parsec = 3.26 ly, 1 yr = 3.15x107 s) | |