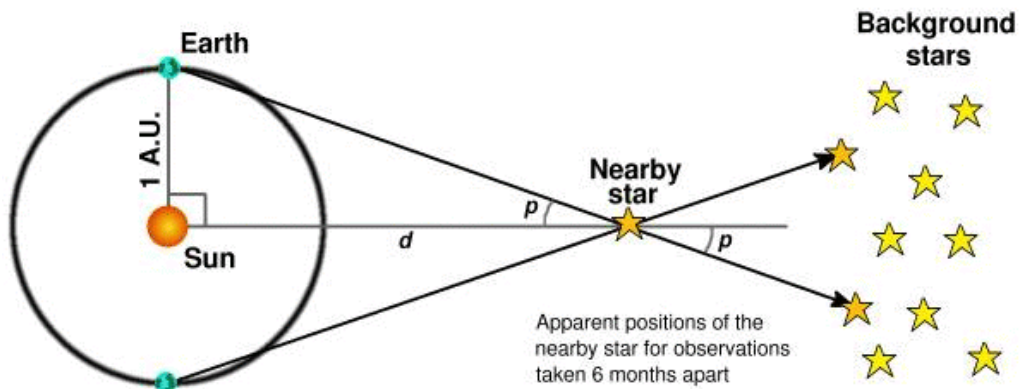


Distance, Motion, Expanding Universe and The Big Bang

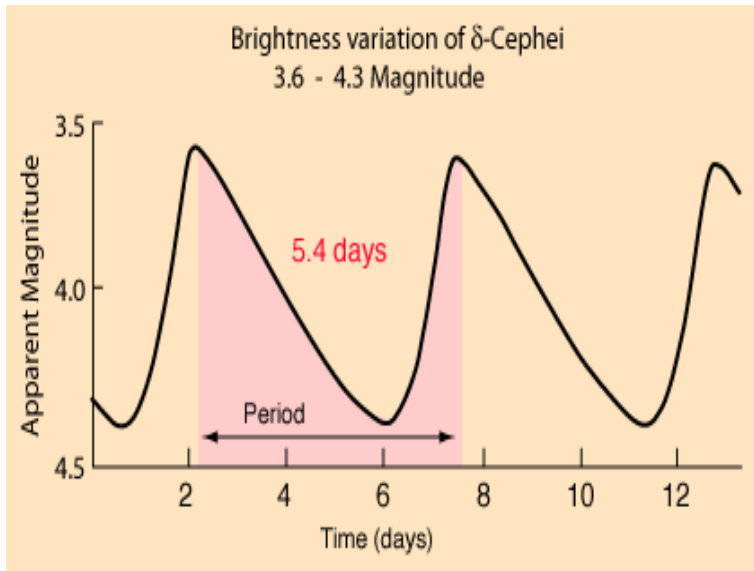
Careful parallax measurements of nearby stars has started an understanding of the distances in space.



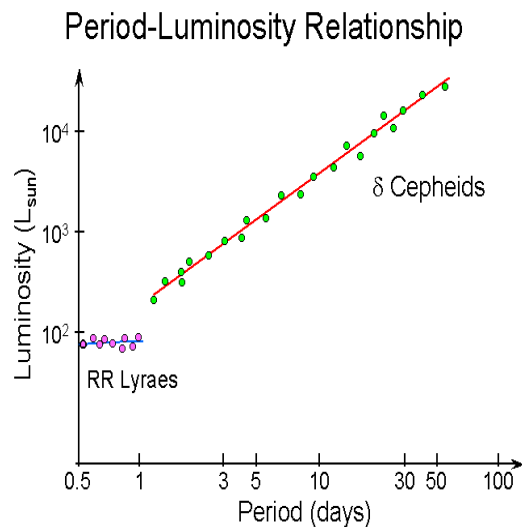
Parallax only works for stars that are close to earth (within 150 l.y.). This however is enough stars to figure out the principle behind the Hertzsprung Russel Diagram. This made it possible to deduce the distance of star based on their position in the H-R diagram and their absolute magnitude that goes with its position on the HR diagram. Makes is possible to find distance up to 2000 l.y. or more.

Cepheid Variable Stars: are a type of star that fluctuates in intensity and does so on a precise

and predictable schedule (astronomical curiosity).



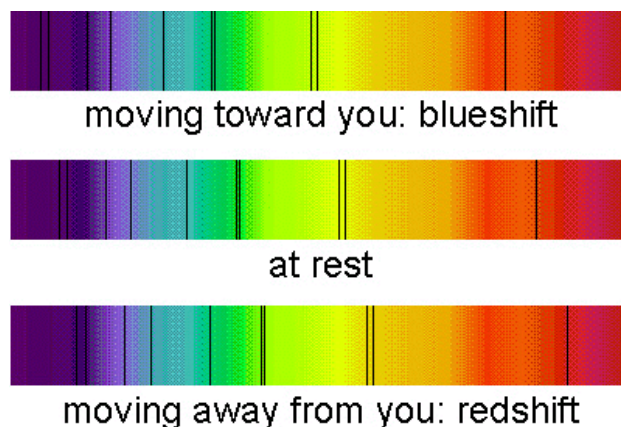
If you analyse the brightness of cepheid variable for which you can deduce distance (see above - stellar relationships that have helped). One cepheid variables are very bright stars. The period by which they fluctuate is related to their brightness.



By finding and analysing cepheid variables in distance galaxies, it was possible to determine how far away the galaxy was. This was done by using the visible magnitude of the variable star and comparing it to its absolute magnitude based on the above relationship.

Stars move through space. As observed from earth they have a transverse and a radial motion. The transverse motion can be observed by watching the star move through the background of space. The radial motion is either towards or away from earth. The motion cannot be seen, but a subtle change in the light from the star tells you exactly how far the radial motion is.

Doppler Effect: can be observed with sound (drop in pitch observed when a fast moving object passes you, or with light!



From this you can detect movement towards and away from you.

When this observation is applied to distance galaxies, it turns out that galaxies are moving away from us at a very fast speed. And, the further the galaxy is the faster it is moving away from us. It would appear that the universe is expanding.

If you could run this expansion backward, reverse time, the universe would appear to be expanding from a single point. Hence the idea of the Big Bang. A small incredibly dense and energetic point of universe, explodes and what we are seeing is the continue expansion from the explosion.