a very good one. In fact, the angle is so small that it is inconvenient to express the angle in degrees. Instead, the parallax angle is usually written in arc-seconds, where:

1 degree = 3600 arc-seconds

Even then the parallax angle is only a fraction of an arc-second. Remember also that equation (2) shows us that as the distance (a) to the star increases, the parallax angle (A) decreases.

Once you have measured the parallax angle in arc-seconds, the distance can be deduced. With the distance measured in parsecs (pc), the inverse of the parallax angle gives the distance directly:

$$distance\ (in\ pc) = \frac{1}{parallax\ angle\ (in\ arc\text{-}seconds)}. \quad \textbf{(3)}$$

If we substitute into equation (2) the radius of the Earth's orbit (1 AU), then it follows that 1 parsec = 3.26 light years. We can therefore also write:

$$distance\ (in\ lyr) = \frac{3.26}{parallax\ angle\ (in\ arc\text{-}seconds)}. \quad \textbf{(4)}$$

The relationship between parallax angle and distance is demonstrated in the next exercise.

1. Select *Parallax Angle and Distance* from the list of exercises. In the window that opens, you are given both a side view of the parallax triangle, and a view of the stars as seen from an observer on Earth. As the Earth moves around the Sun in its orbit, our view of a nearby star changes, indicated by the blue line which is our line-of-sight from the Earth to the star. As the angle of the line-of-sight changes, so does the apparent position of the near-by star when viewed against the background stars.

2. The line-of-sight from the Earth to the star corresponds to the hypotenuse of the triangle when the Earth is at the extreme position in its orbit. The apparent position of the nearby star against the background stars is determined by the termination of this line at the distance of the background stars.

3. You are given a series of problems to solve, either:
   a. You are given the parallax angle, in which case you need to calculate the distance both in parsecs and in light years.
   b. You are given the distance, in which case you need to calculate the parallax angle both in degrees and in arc-seconds.
4. Enter your results and select the button labeled *Check your answer.*
5. Select the button labeled *New Problem* to generate another problem.
6. If you need help, it is available from the *Help* item on the overhead menu.

3. Stellar Parallax - Calibration of the Telescope

Before measuring the parallax angle for nearby stars, an astronomer must know how to translate his measurements into an angle, that is, he must find out how wide is his field of view.

To calibrate our telescope we will make use of the Earth's rotational period of 24 hours. Telescopes are normally equipped with tracking motors which turn the telescope at just the right rate to