

## Variable Star of the Year U Cephei

Lying at high declination, less than 10 degrees away from Polaris, is the eclipsing variable U Cephei which varies between magnitudes 6.7 and 9.4.

U Cephei consists of two stars which take just under 2.5 days to orbit each other. Because their orbit is edge on as seen from the Earth, we see eclipses when the stars pass in front of each other. However, the primary star is much brighter than the secondary star and, as a result, whereas we see a dip in brightness of nearly 3 magnitudes when the primary star is eclipsed by the secondary, the dip in brightness that occurs when the primary eclipses the secondary is too small to be seen visually.

The primary is believed to be a B type main sequence star of around 4 solar masses. The secondary is an evolved G type giant star of around 3 solar masses that is very slowly losing mass to the primary. This transfer of mass very slowly alters the orbital period of the system. Consequently over a period of time, the eclipses slowly move away from the times predicted by the General Catalogue of Variable Stars (GCVS). By monitoring the times of eclipses and seeing how their times compare with GCVS predictions we can detect these changes. In the accompanying light curve, the primary eclipse is centred later than (the GCVS predicted) phase 0. This indicates that primary eclipses in 2003 were occurring later than predicted.

The accompanying predictions are based on observations more recent than those used by the GCVS and so will allow you to plan your observations to coincide with eclipses.

Eclipses of U Cephei last approx 9 hours. By making brightness estimates every 30 minutes or so, a few hours either side of the predicted times, you can follow the course of the eclipse, seeing it fade to minimum, stay at minimum for around 2 hours and then brighten again. Observers with smaller binoculars will see U Cephei fade and then disappear and it approaches minimum. Observers with larger binoculars or a small telescope should however be able to see that it has a "flat" minimum, indicating that the primary star is totally eclipsed by its companion.

Primary Eclipse of U Cephei in 2003

