

Eta Geminorum (Propus) is a red giant star. It is also a visual double with a 6th magnitude companion approx. 1.6 arc seconds distant. The red giant star also has a very close companion that is only detectable spectroscopically.

Although it had been known since the mid 19th century that Eta Gem varies in brightness, astronomers in the first half of the 20th century noticed that it also seemed to go through particularly faint spells at intervals of around 8 years. It was also noted that the star's radial velocity graph showed a minimum coincident with these fades.

As is the case for many red giant stars, the brightness variations of Eta Gem are semi-regular – the period being approx 233 days. Variable star catalogues usually list Eta Gem as having a magnitude range of 3.1-3.9. However, anyone who has regularly observed Eta Geminorum is likely to have noticed that it usually only varies in the upper half of this range.

The deeper fades are due to Eta Gem also being an eclipsing variable, with the eclipses being caused by the spectroscopic companion and occurring at intervals of approx 2984 days (just over 8 years).

The most recent eclipses occurred during Jan-Mar 1980, Mar-May 1988, May-Jly 1996 and Jly-Sep 2004. Unfortunately, the 1996 eclipse occurred when Eta Gem was close to conjunction with the Sun and the 2004 eclipse was already half completed by the time that Eta Gem emerged from the early August morning twilight.

The 2012 eclipse is more favourably timed, with mid eclipse occurring at the start of October. The eclipse will (probably) be underway by late August and will have ended by mid November. This will be the first time since 1988 that the whole eclipse has been observable. However, Eta Gem will only be well placed for observation in the second half of the night.

The accompanying light curve is based on observations made by members of the North Western Association of Variable Star Observers (NWA VSO) during the 1979-1980 apparition.

There is some uncertainty as to the duration of the eclipse. The duration of totality is usually quoted as being about 30 days, but there has been disagreement regarding the duration of the partial phase with some sources quoting a few days and others suggesting several weeks – determining the duration is complicated by the presence of the semi-regular variations. Observations made by NWA VSO members in 1980, by JAS VSS members in 1988 and by BAA VSS members in 2004 were consistent with a partial phase lasting several weeks.

With Eta Gem being a red star and most of the available comparison stars being white or yellow, it is inevitable that some observers will see Eta Gem as being slightly brighter than do others. This is not a problem – all observers should still see the same depth of eclipse - nearly half a magnitude. Having said that, with Eta Gem also showing semi-regular variations don't be surprised if the brightness of Eta Gem at the end of the eclipse is different from that just before the eclipse – in 1980, 1988 and 2004 Eta Gem was probably fading towards a semi-regular minimum when the eclipse ended.

It is important to observe Eta Gem when it is well above the horizon – when lower in the sky, the effects of haze and atmospheric absorption can affect the apparent brightnesses of the variable and its comparisons by different amounts, especially if they are at different altitudes. Fortunately, in the autumn the variable and comparisons are aligned fairly horizontally, whereas in the spring they line up more vertically.

