

Double-double in color

Telescope: **AS80** (Zeiss AS80/1200 mm)

Eyepieces:

A-10 - Zeiss ZAO-I 10, f=10mm, (120×, 24')

Time: 2014/02/25 17:50-19:00UT

Location: Říčany

Weather: Bad transparency with strong humidity. Seeing was quite good near zenith.

Mount: Alt-az. TS AZ-5

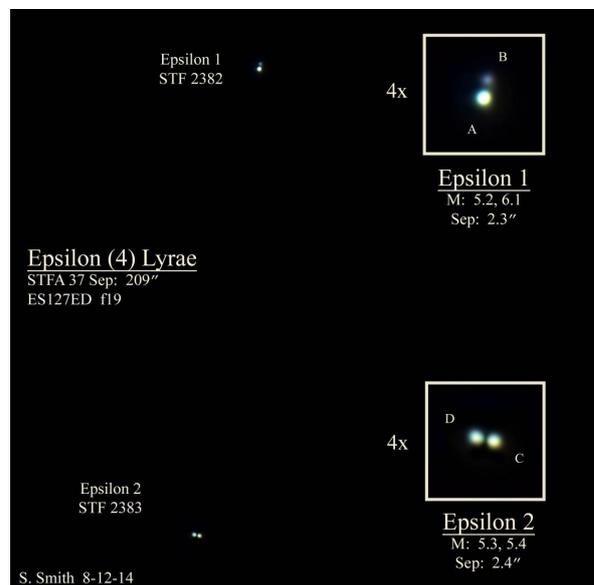
Accessories: Baader 1.25" zenith prism

I have observed $\epsilon_{1,2}$ Lyrae maybe a hundred times. It is one of my favorite multiple star system. Especially in small 63 and 80mm refractors where all four stars show nice large Airy's discs with hints of diffraction rings. One night I sighed that there was only one thing missing from the perfection. A color contrast between individual components, as all four stars looked to me always clearly white. This was supported by their listed spectral types: A4V+F1V for ϵ_1 Lyr and A8V+F0V in the case of ϵ_2 Lyr.

For the hundred plus one time, the things became different. I took out my AS80/1200 just for 30 minutes session. It was clear that more clouds would be coming soon. There was quite some humidity in the air and views of the Moon were lacking contrast. At least zenith was more or less fine. As there was still a twilight, I opted for few doubles. I wanted to play a little bit with my new 10mm ortho to see what it can do on doubles.

The unequal pair δ Cygni was nicely split with this eyepiece already at 120×. I usually need higher powers to see the faint companion that cleanly.

The biggest surprise came however with $\epsilon_{1,2}$ Lyrae. Already at the first sight, there was a color! Subtle in case of ϵ_1 and very subtle in case of ϵ_2 . Overall impression was that the stars are white. However, fainter star of ϵ_1 was definitely more reddish than the main component which looked slightly more blueish. In case of ϵ_2 , the leading star



was white while the second companion was slightly more orange. Here the difference was very subtle and at the limit of repeatability.

The trick was to look at the setting Moon with naked eyes before looking to the eyepiece. This switched the eyes to day-light color vision which lasted couple of tens of seconds. The color difference between the stars was fading away with time as the eyes were switching back to the black and white night vision.

I don't give too much of credibility to my observations of color in doubles, I know that they quite often don't agree with what one would expect based on the spectral types of the stars. But in this case it seems I got

it right. Now, I'm really surprised that I could detect slight changes in color between A8 and F0 type.

In response to my observation, Steve Smith took wonderful image of the Double-double through his 127mm refractor, presented in the previous page. Here, the colors came completely different than what I saw. Fainter companion of ε_1 is bluer, as well as the second component of ε_2 .

I'm not sure, how important was the eyepiece. I did not compare new ZAO-I directly with my workhorse CZJ O-10. My feeling is that it could have played significant role. I noticed already in the past, that another eyepiece, TMB Mono 16mm, provides visibly more vivid colors than CZJ O-16 when compared head-to-head. For example, the blue and orange colors of the two bright stars accompanying globular cluster M13 were more pronounced in the monocentric eyepiece.

Last objection to ε_{12} Lyrae is gone as there is definitely some color to be seen and from now, the Double-double is perfect to me.

Alexander Kupčo