06 – Multiple Star Collection

Procedure

Using your star atlas (e.g., the Trained Eye Star Atlas) select multiple stars (stars that orbit around each other) to observe, and sketch to scale, labeling components A,B,C,D from brightest to faintest on the sketch. Note the eyepiece you used and calculate the magnification (focal length of telescope divided by focal length of eyepiece). Judge colors & magnitude differences for each component star.

Colors of Stars you may select from are

Colors	Examples
Blue	024912 ξ Persei
Blue-white	35468 Bellatrix, 12031 Segin, 131907 Rigel
White	073765 Alpheratz, 216956 Fomalhaut, 151881 Sirius
Yellowish-white	187642 Altair, 197345 Deneb, 021133 Caph
Light-yellow	038787 Mirfak, 21732 Achird
Deep-yellow	075151 Hamal, 021609 Schedar, 094027 Aldebaran
Orange	39801 Betelgeuse, 110920 Menkar, 184415 Antares,
Red	129825 Mira,
No-color (too faint to tell)	

Judge magnitude difference of component star from brightest component star as:

Can't see a difference = 0
Can just see a difference = 1
Can easily see a difference = 2
Way different = 4
A candle compared to a searchlight = 7.

Tricks of the Trade

1) *Always use a low-power eyepiece to acquire and center the star in the telescope.*

2) *Develop a sense for how bright stars of different magnitude appear through different eyepieces.*

3) *Develop a sense of how different separations for multiple stars appear through different eyepieces.*

4) *To see color in bright stars, defocus the images slightly.*

5) *Rule of thumb for selecting an eyepiece: Use an eyepiece with a focal length equal to or less than the separation of the components of a multiple star. If the separation is 20", then a 20-mm eyepiece will just let you see both, a 10-mm eyepiece will let you see them easily. If they are 5 magnitudes or more different, you'll need even more magnification.*

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COLORS
Brightest component ____________________
2nd brightest component ____________________
3rd brightest component ____________________
4th brightest component ____________________
MAGNITUDE DIFFERENCES:
2nd brightest compared to brightest component ______
3rd brightest compared to brightest component ______
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Eyepiece (mm) ___
Magnification ___
Resolved? ____

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Questions

1) Add up the number of stars of each color into Table 1.

Table 1: Colors of Stars

Color	Brightest Component	2nd Brightest Component	3rd Brightest Component	4th Brightest Component
Blue				
Blueish White				
White				
Yellowish White				
Light Yellow				
Deep Yellow				
Orange				
Red				
No color				

2) How many components stars showed color? (*Remember that for faint stars white means NO color so don't count faint white stars)* _____

3) Looking at Table 1, was there a systematic difference between the colors (temperatures) of the brightest component of a multiple star and the colors (temperatures) of the fainter component stars? *Hint: The colors of stars range from blue hot to red cool:*

blue blue-white white yellowish-white light -yellow deep-yellow orange red

Describe

4) What was the magnitude of the faintest component star in which you saw color? _____

5) Which was the name of that multiple star? _____

6) What was its color? _____

7) What was the name of the multiple star that had the component star with the coolest color? _____

8) What was its color (temperature)? _____

10) Was it the brighter or fainter component? _____