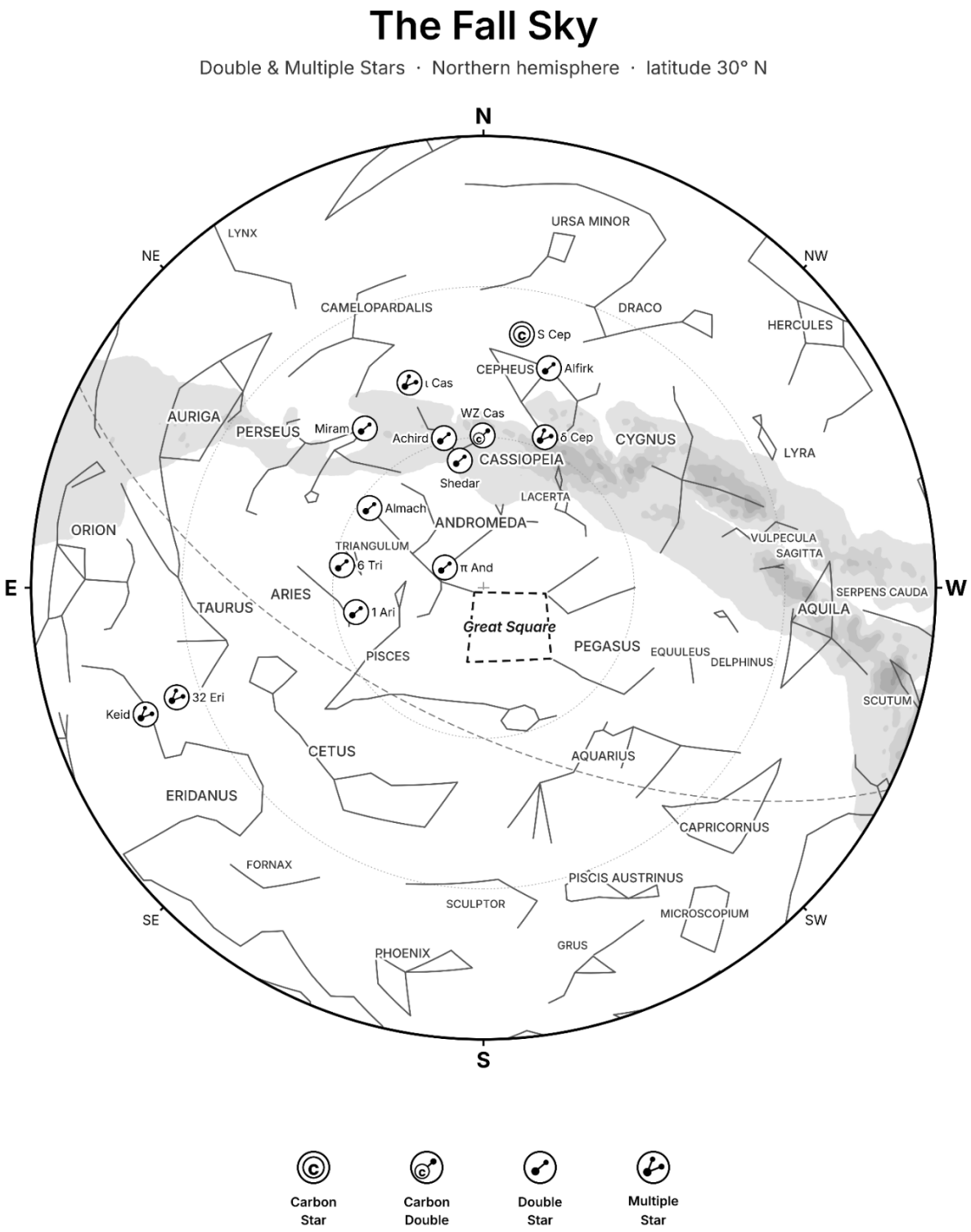
Lab 2: Multiple Star Systems and Carbon Stars

Fall Multiple Star and Carbon Star List

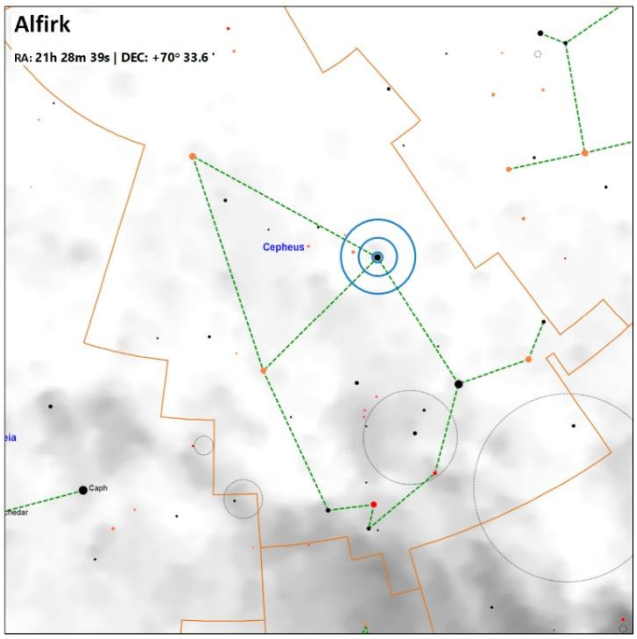
Constellation	Star	Alias	RA / Dec (J2000)	Mag	Sep	Comments
Cepheus (Cep)	Alfirk (DS)	SAO-010057, HIP-106032	21h 29m | +70° 34'	3.2 | 8.6	13.5"	
Cepheus (Cep)	S Cep (CS)	SAO-010100, HIP-106583	21h 35m | +78° 37'	7.4 – 12.9	BV=4.45	
Cepheus (Cep)	Delta Cep (MS-3)	SAO-034508, HIP-110991	22h 29m | +58° 25'	4.2 | 13 | 6.1	21.5", 41"	
Andromeda (And)	Pi And (DS)	SAO-054033, HIP-2912	00h 37m | +33° 43'	4.4 | 7.1	36.2"	
Andromeda (And)	Almach (DS)	SAO-037734, HIP-9640	02h 04m | +42° 20'	2.3 | 5.0	9.5"	blue & gold
Cassiopeia (Cas)	WZ Cas (DS)	SAO-021002, HIP-99	00h 01m | +60° 21'	7.4 | 8.3	58"	BV=2.84 | red & blue pair
Cassiopeia (Cas)	Shedar (DS)	SAO-021609, HIP-3179	00h 41m | +56° 32'	2.2 | 9.0	70.9"	
Cassiopeia (Cas)	Achird (DS)	SAO-021732, HIP-3821	00h 49m | +57° 49'	3.4 | 7.4	13.6"	
Cassiopeia (Cas)	Iota Cas (MS-3)	SAO-012298, HIP-11569	02h 29m | +67° 24'	4.7 | 6.9 | 9.1	3", 8.5"	
Triangulum (Tri)	6 Tri (DS)	SAO-055347, HIP-10280	02h 12m | +30° 18'	5.3 | 6.7	4"	
Aries (Ari)	1 Ari (DS)	SAO-074966, HIP-8544	01h 50m | +22° 17'	6.3 | 7.2	2.9"	
Perseus (Per)	Miram (DS)	SAO-023655, HIP-13268	02h 51m | +55° 54'	3.8 | 8.5	29"	
Eridanus (Eri)	32 Eri (MS-3)	SAO-130806, HIP-18255	03h 54m | -02° 57'	4.8 | 5.9 | 10.5	6.9", 165"	
Eridanus (Eri)	Keid (MS-3)	SAO-131063, HIP-19849	04h 15m | -07° 39'	4.4 | 9.5 | 11.2	83", 78"	

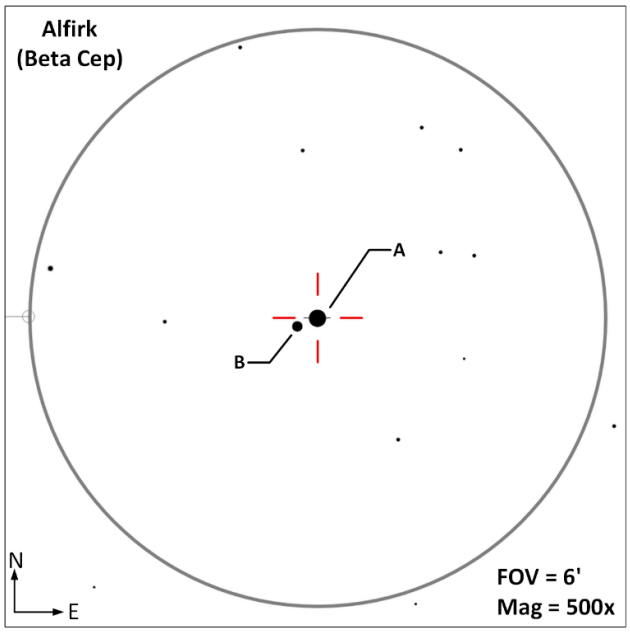
Lab 2: Multiple Star Systems and Carbon Stars



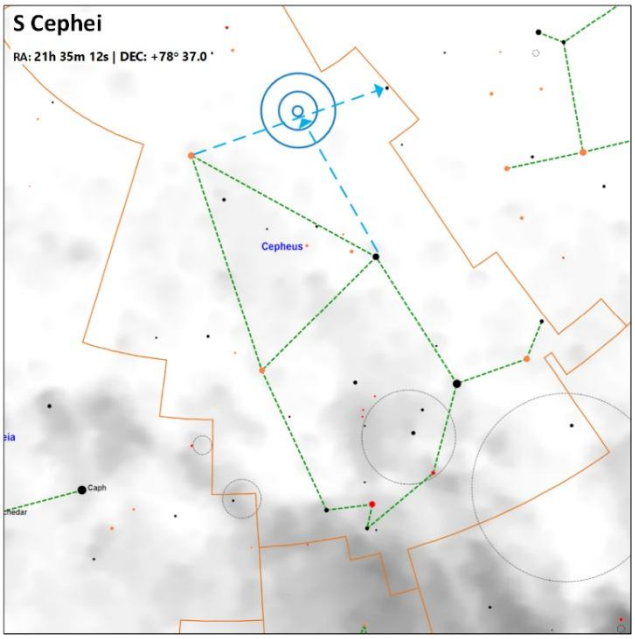
Lab 2: Multiple Star Systems and Carbon Stars

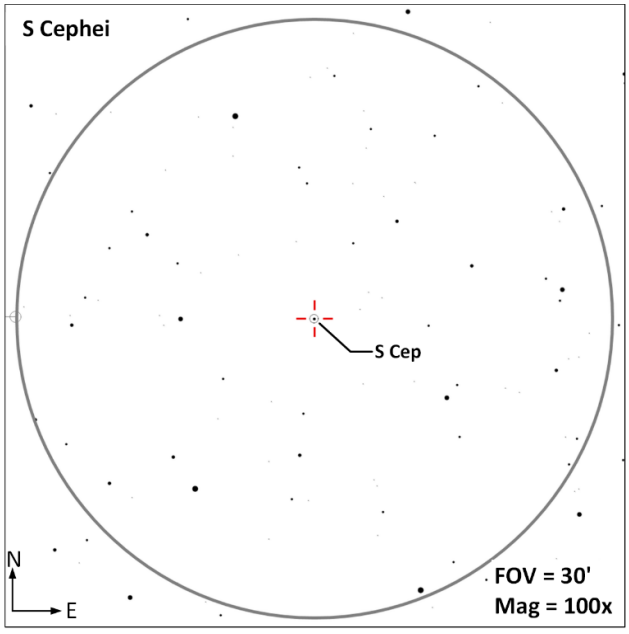
Alfirk (DS || AB | Mag=3.2,8.6 | Sep=13.5" | PA=248° | mBortle=9 | mApt=50mm | Spec=B2III, A2V | Color=blue-white, white |) Considered a showpiece double, consisting of a blue-white primary star and a white companion star. The pair orbit each other with a period of at least 30,000 years. The system is located about 690 light-years away.





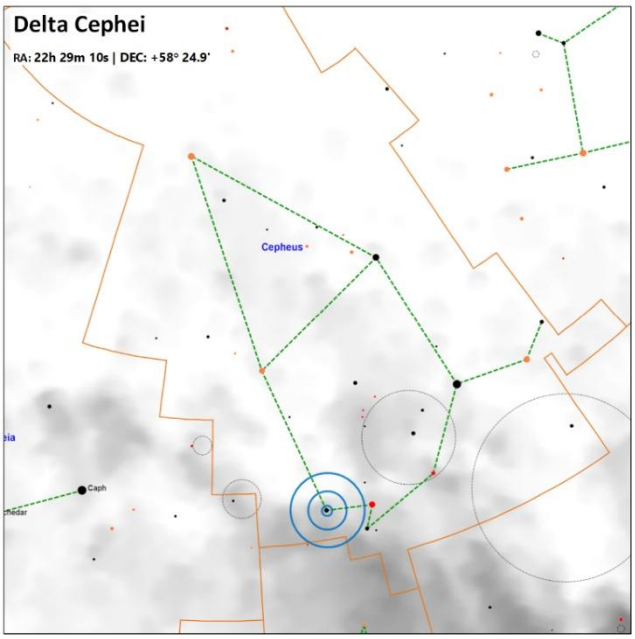
S Cephei (CS || Magnitude Range= 7.4 to 12.9 | Period=1.33y | Spec=C7,4e | BV=+4.45 | Color=deep red |) This carbon star is a Mira-type variable located about 1,590 light-years away and varies greatly in magnitude over a period of 484 days. With a B–V index of +4.45, this should appear to be a very red star; however, the color may not be as apparent when the star is in the dimmer part of its cycle.

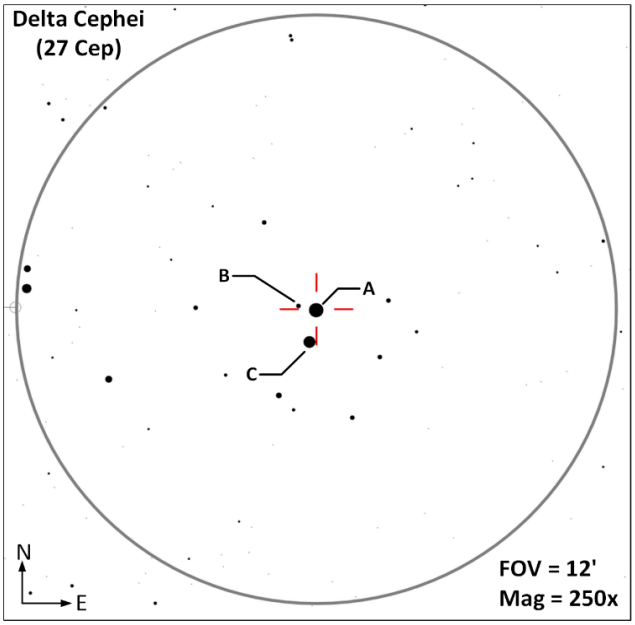




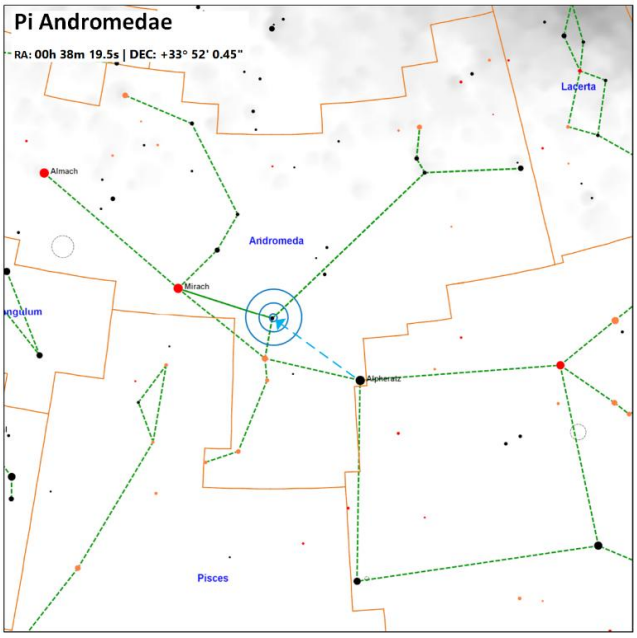
Lab 2: Multiple Star Systems and Carbon Stars

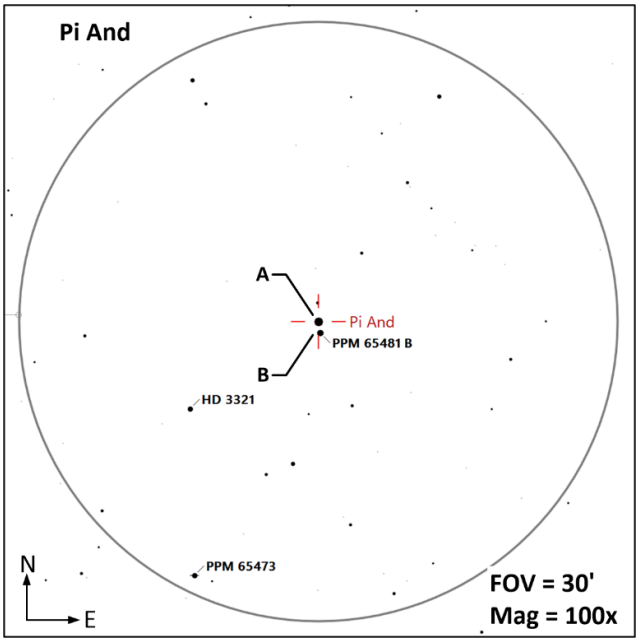
Delta Cephei (MS-3 || **AB** | Mag=4.2,13 | Sep=21.5" | PA=282° | mApt=180mm | Spec=F5Iab-G1Ib, ? | Color=yellow-white, ? || **AC** | Mag=4.2,6.11 | Sep=41" | PA=191° | mBortle=9 | mApt=50mm | Spec=F5Iab-G1Ib, B7III | Color=yellow-white, blue-white |) Located 891 light-years away, this system appears on a number of colored-star and multiple-star lists.





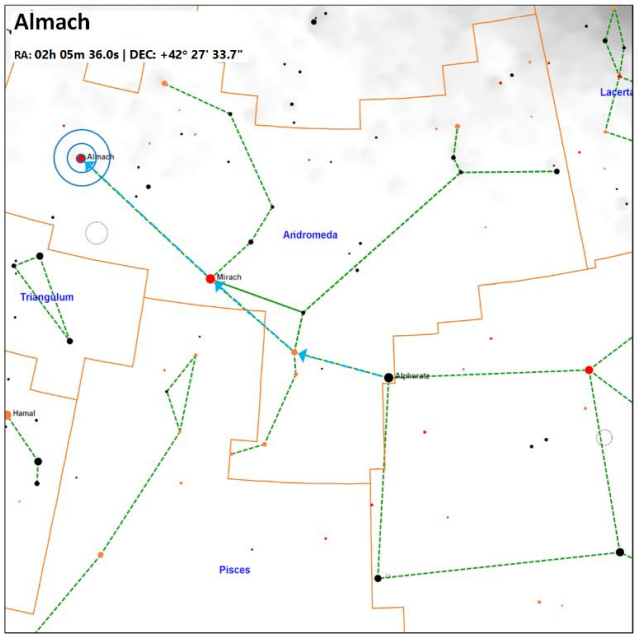
Pi And (DS | **AB** | M = 4.4, 7.1 | Sep = 36.2" | PA = 174.5° |) – A double star system that should be easily resolved in a small telescope, located 598 ly from Earth.

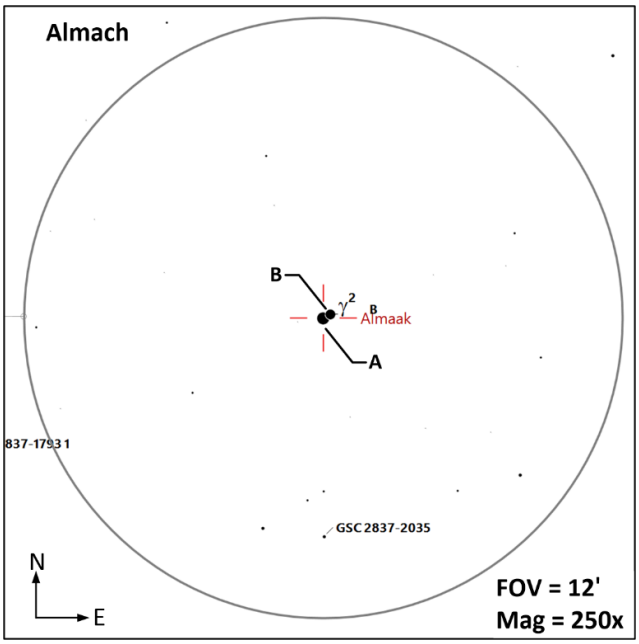




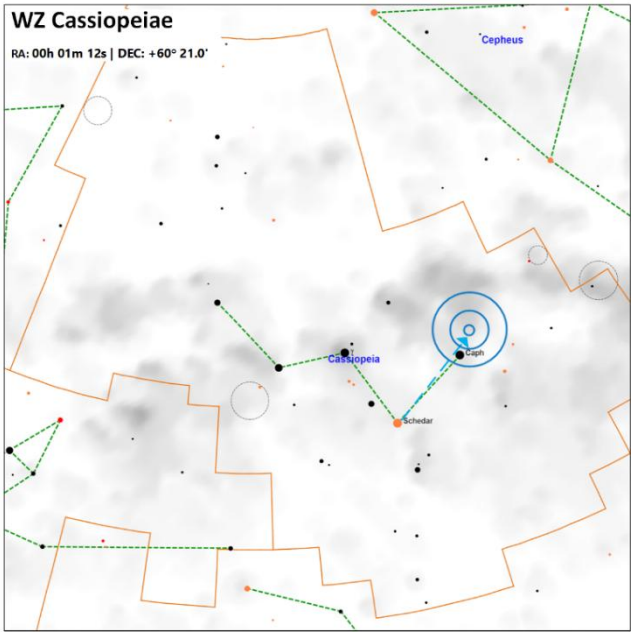
Lab 2: Multiple Star Systems and Carbon Stars

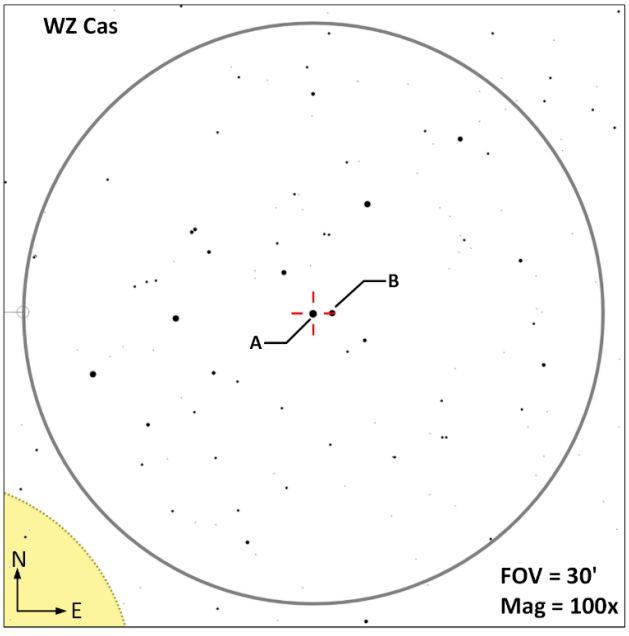
Almach (DS | **AB** | M = 2.3, 5.0 | Sep = 9.5” | PA = 63.2° |) – A beautiful gold and blue pair. It is one of the best doubles in the northern sky and bears a striking resemblance to Albireo. This system is 390 ly from Earth.





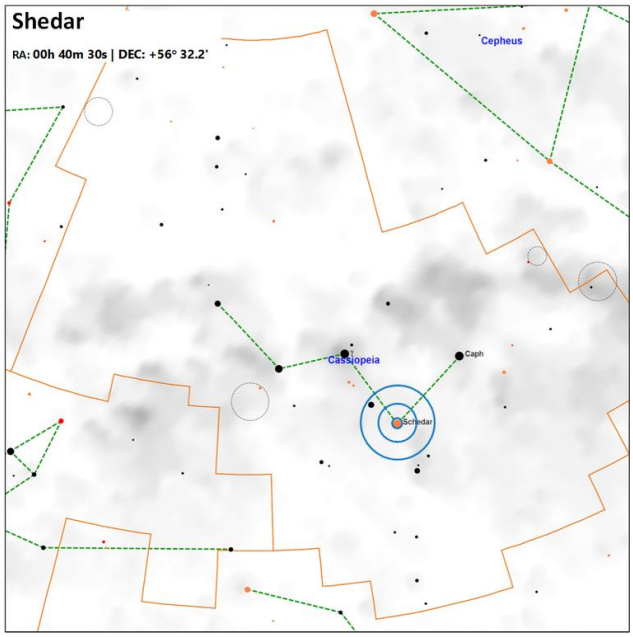
WZ Cassiopeiae (DS, CS || Magnitude Range= 7.4 to 8.3 | Spec=C9,2JLi, ? | BV=+2.84 | Color=red || **AB** | Mag=7.4, 8.3 | Sep=57.8" | PA=88.8° | mBortle=9 | mApt=50mm | Spec=NIab: p | Color=red, blue |) This ranks among my top five favorite doubles: a dark red primary and blue companion in a field of stars. This is an optical double, and (as with many carbon stars) it can sometimes take a few seconds for the red of the primary to become apparent. A delight to view that should not be missed.

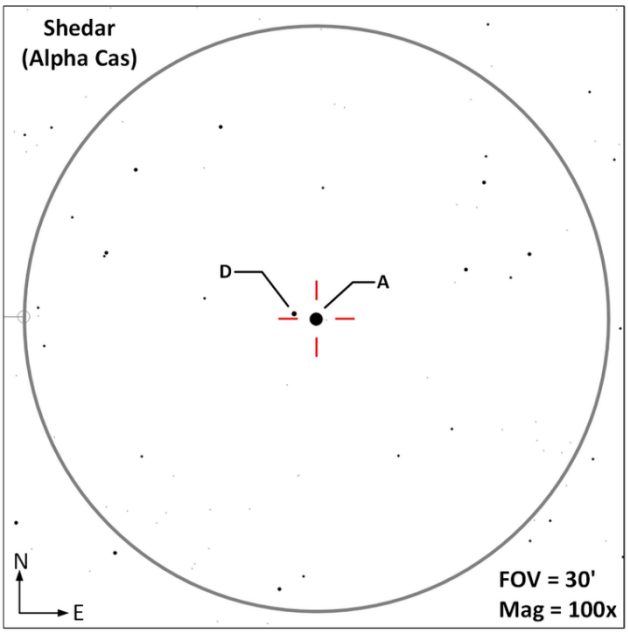




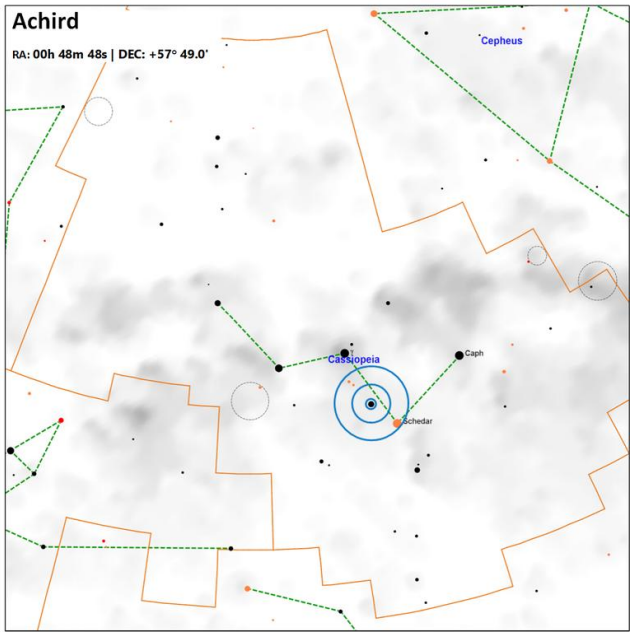
Lab 2: Multiple Star Systems and Carbon Stars

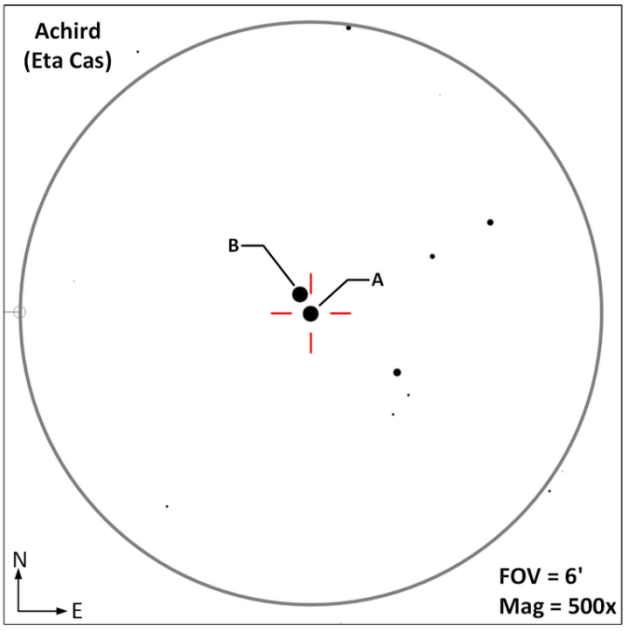
Shedar (DS || **AD** | Mag=2.2,9 | Sep=70.9" | PA=282° | mBortle=9 | mApt=50mm | Spec=K0IIIa, ? | Color=pale rose, blue-white |) Located 228 light-years away, this is an optical double.





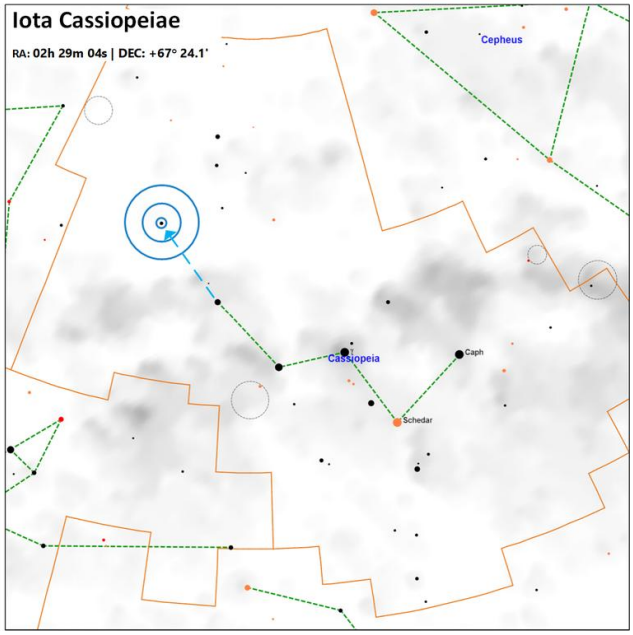
Achird (DS || AB | Mag=3.4,7.4 | Sep=13.6" | PA=328° | mBortle=9 | mApt=50mm | Period=479y | Spec=G0V, M0V | Color=yellow, orange-red |) Considered a showpiece double, Achird is located 19.4 light-years away with a period of 479 years. The orbit has a large eccentricity, bringing the two stars as close as 36 AU to each other. Reported colors range from gold, yellow, or topaz for the primary to orange, red, purple, or garnet for the secondary.

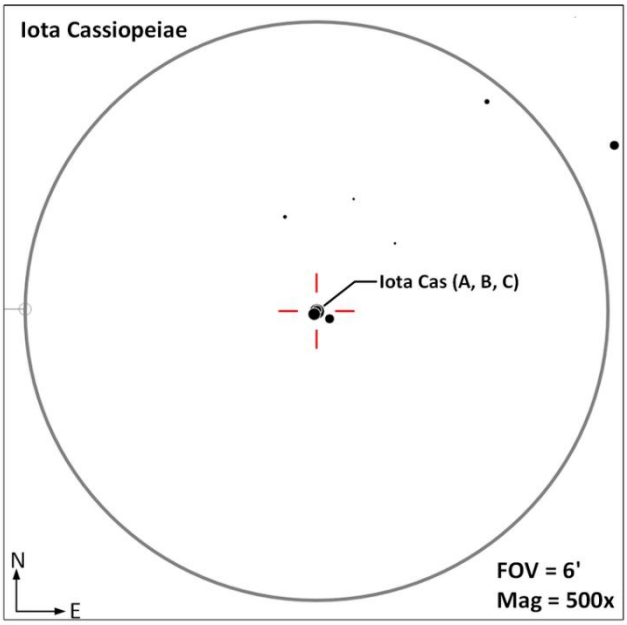




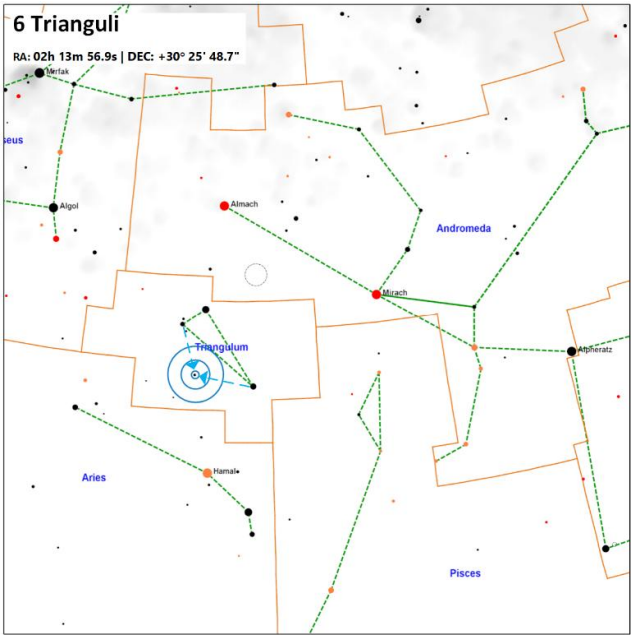
Lab 2: Multiple Star Systems and Carbon Stars

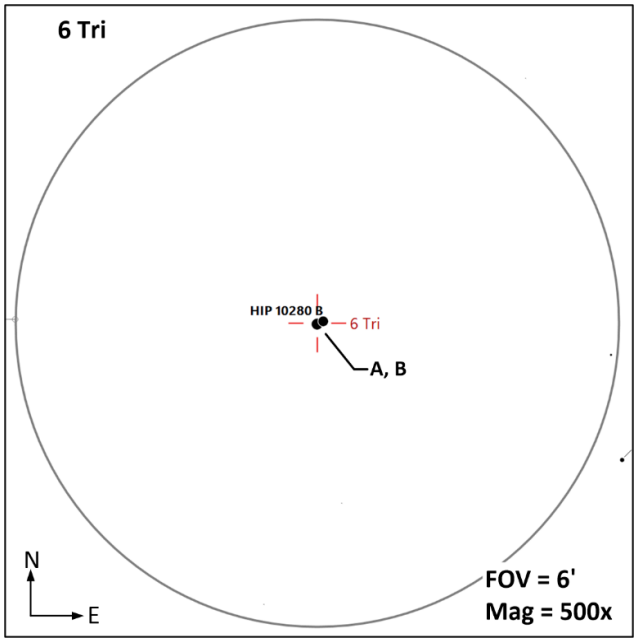
Iota Cas (MS-3 || AB | Mag=4.7,6.9 | Sep=3" | PA=231° | mBortle=9 | mApt=60mm | Spec=A5p, F5V | Color=white, yellow-white || BC | Mag=6.9,9.1 | Sep=8.5" | PA=99° | mBortle=9 | mApt=50mm | Spec=F5V, G5 | Color=yellow-white, yellow || AC | Mag=4.7,9.1 | Sep=6.9" | PA=117° | mBortle=9 | mApt=50mm | Spec=A5p, G5 | Color=white, yellow |) A celebrated triple star system consisting of a brilliant white primary star with yellow-white and yellow companions.





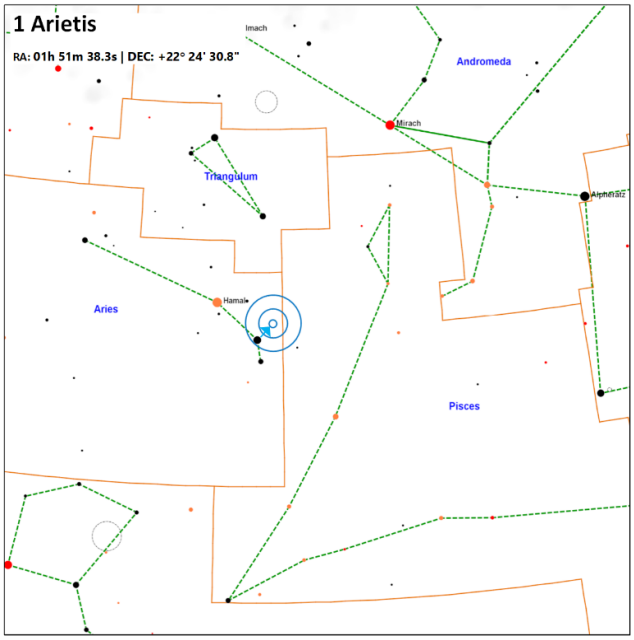
6 Trianguli (DS **AB** | M=5.3, 6.7 | Sep=4.0" | PA=67° |) – A tight gold and blue binary star system. This star is also part of the Triangulum Minor asterism described below.

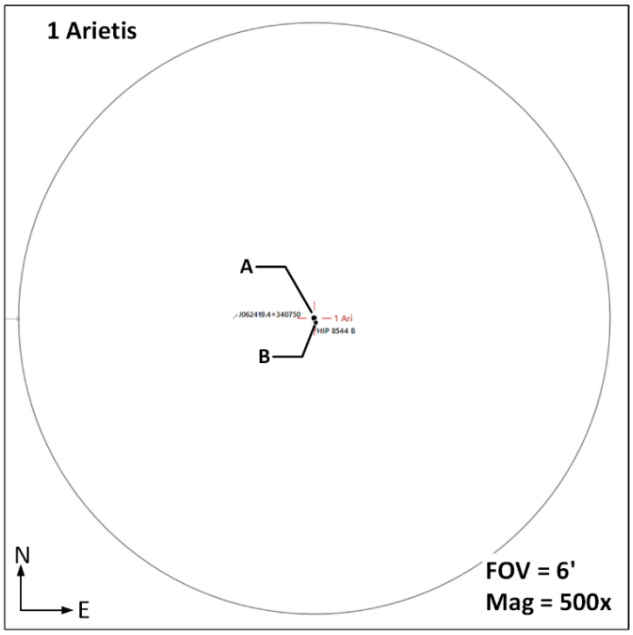




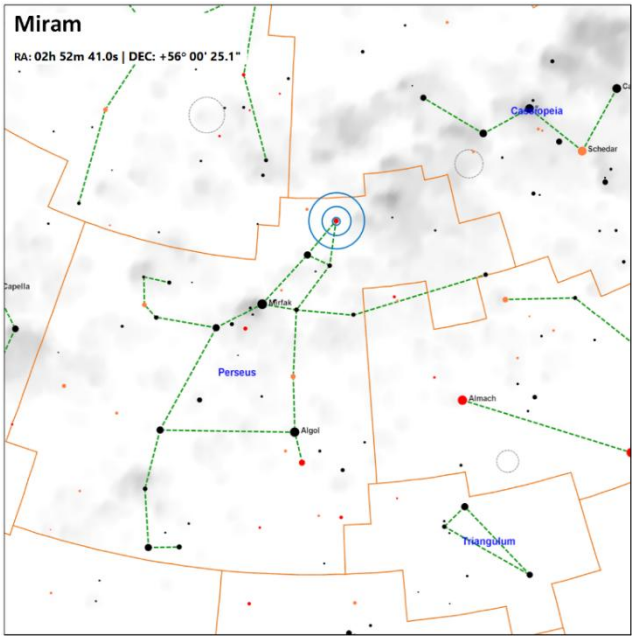
Lab 2: Multiple Star Systems and Carbon Stars

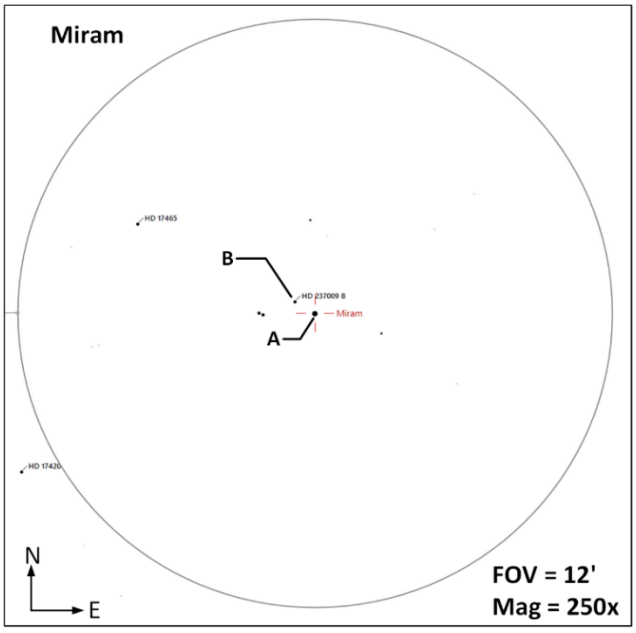
1 Arietis (DS **AB** | M=6.3, 7.2 | Sep=2.9” | PA=164° |) – An excellent pair of yellow and blue stars. This system is 590 ly from Earth and should be resolvable with telescopes of 50mm aperture or more under excellent conditions. It appears on the list of the top 23 colored double star systems.





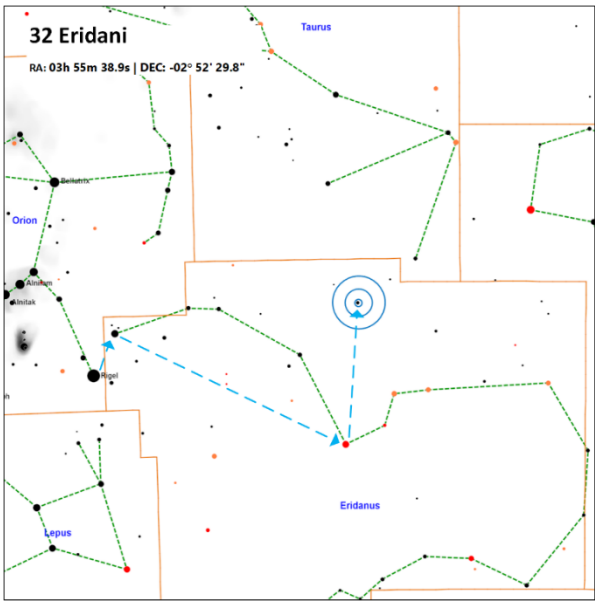
Miram (DS **AB** | M=3.8, 8.5 | Sep=29” | PA=301° |) – Eta Persei is an orange supergiant about 1,000 ly from Earth; with its dimmer blue companion it makes a nice target for small telescopes. The field of view contains a sprinkling of background stars.

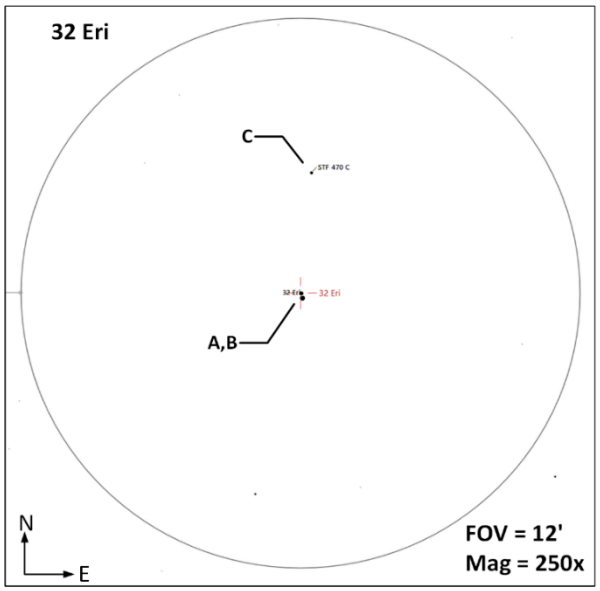




Lab 2: Multiple Star Systems and Carbon Stars

32 Eri (MS-3 **AB** | M=4.8, 5.9 | Sep=6.9” | PA=349° || **AC** | M=4.8, 10.5 | Sep=165” | PA=5° |) – Appears on the “22 Best Colored Double Stars” list, with reportedly topaz-yellow and sea-green components. It is not currently known if the AB components are actually physically associated with each other. Research indicates the C component is not associated with the system.





Keid (MS-3 **A, BC** | M=4.4, 9.5 | Sep=83” | PA=102° || **AC** | M=4.4, 11.2 | Sep=78” | PA=98° || **BC** | M=9.5, 11.2 | Sep=7.7” | PA=327° |) – The primary is a main-sequence star, the B component is a white dwarf, and the C component is a red dwarf. The two dwarfs orbit each other every 248 years. The white dwarf is quite dense; 1 cubic inch of this star weighs about two tons. The red dwarf star has 16% of the mass of our sun.

