Observing Plan for 02/06/24

Target: GD 358

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Our target GD 358 is a variable white dwarf star of the DBV2 type with a B-V of -0.1. Like other pulsating white dwarfs, its variability arises from non-radial gravity wave pulsations within the star itself. Its position is RA of 16h 47m 19.02s and a DEC of +32° 28' 31.9" at a distance of 43 pc. GD 358's pulsation amplitude can range up to 0.30 mag with a pulsation period of 600-700 s. It has an apparent magnitude of V = 13.65 and B = 13.53, thus we can use a B-filter to image the star to get the 0.12 mag difference.

We will be imaging GD 358 on February 6th (*Figure 1*) at 03:00, as it is coming over the horizon. We will be imaging until sunrise and will take flats during sunrise.

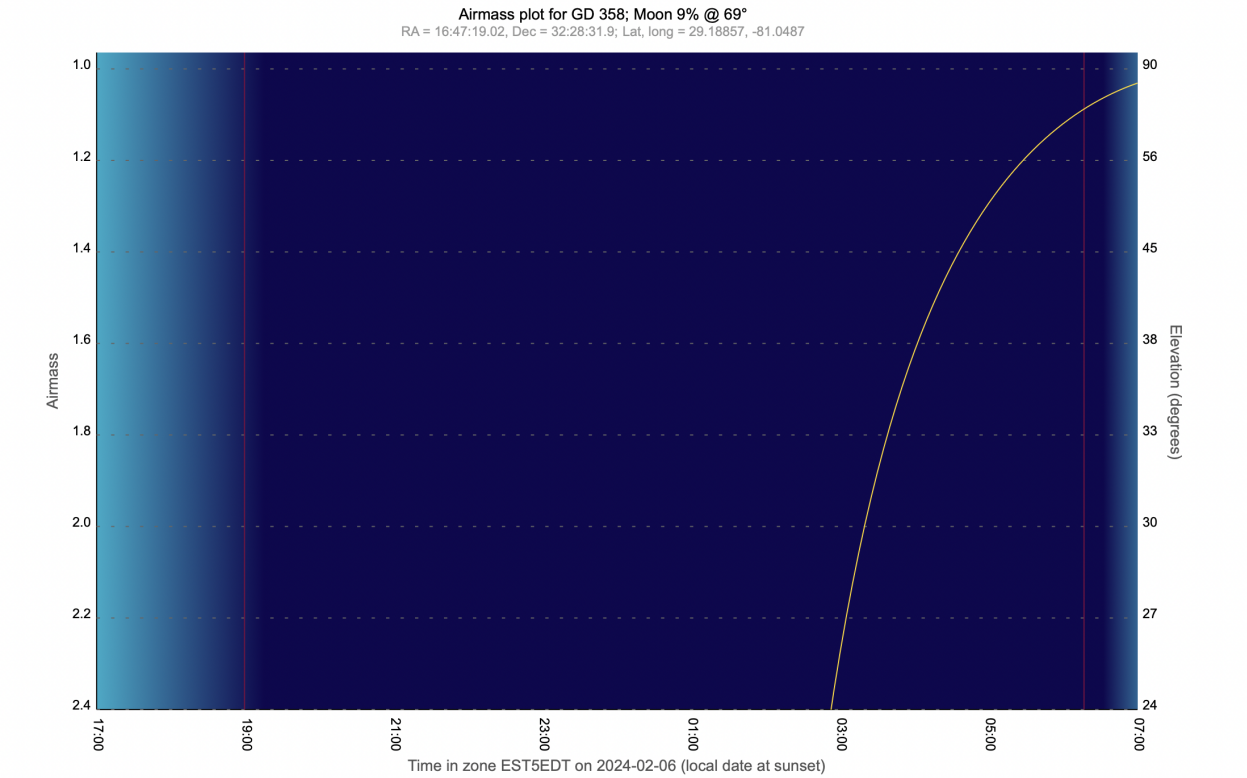

Figure 1: Airmass plot of GD 358 from Swartmore

This run will also be focused on getting the best exposure times and position in sky for imaging (*Figure 2*).

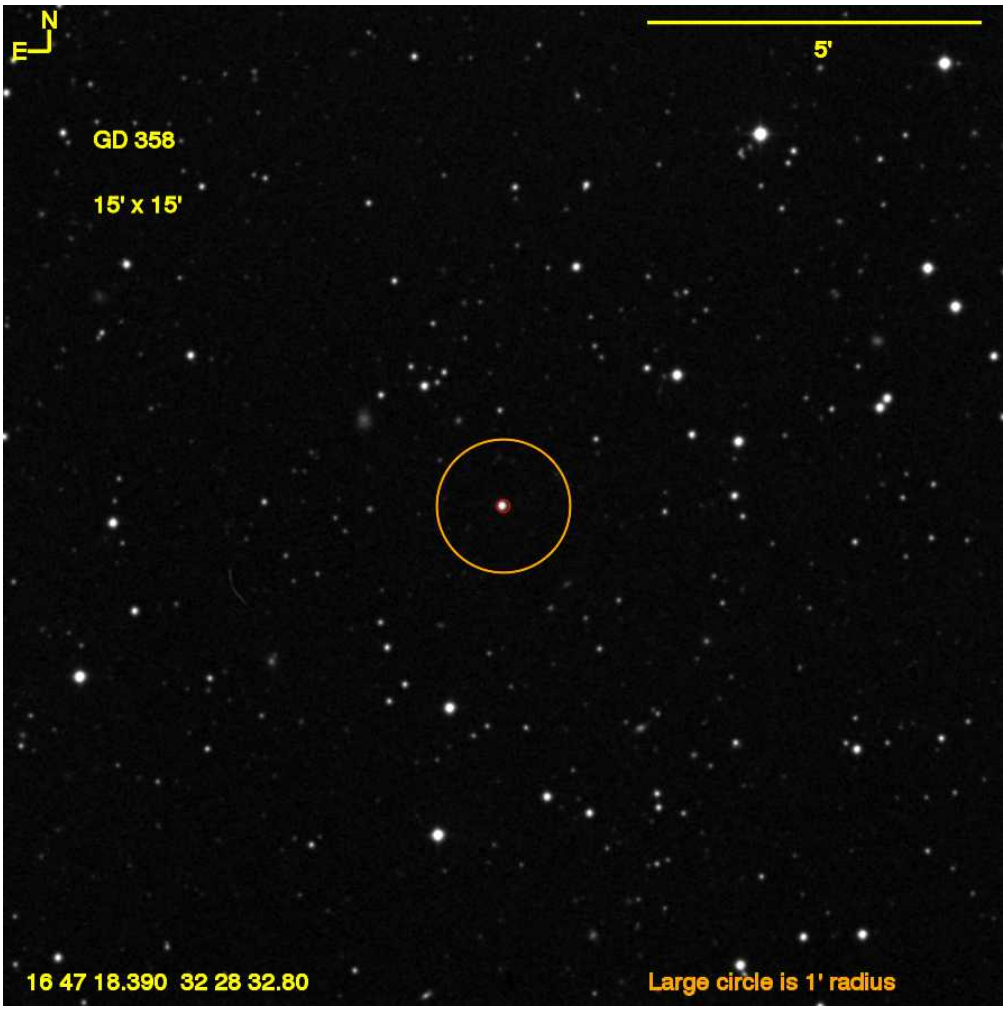

Figure 2: Finder Chart of GD 358 from Swarthmore

We calculated an exposure time of approximately 10 seconds using the equation given in class (*Figure 3*). Using the V and B apparent magnitudes where as you can see, there is little to no difference in the exposure time.

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A =  871.0643671054497
B =  8818.400299072626
C =  1231.5043202071988
t =  9.982073697141201
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A =  972.8597780713137
B =  9836.354408731266
C =  1231.5043202071988
t =  9.983973551402904
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Figure 3: Apparent magnitude in V and B, respectfully, exposure calculations

Once we collect a sufficient amount of data, we will perform differential photometry using AstroImageJ on the calibrated FITs images. Exporting the time series from the analysis and importing it into a Fourier analysis program, most likely Period04. This will allow us to confirm its pulsation amplitude and frequencies. After more runs, we are hoping to have enough data to compile and solve for the period of GD 358 so we are able to confirm its current period.