



# Recording Stellar Heartbeats

## Plotting Variable Star Cycles

### Classroom Activity

#### Material List:

- Graph Paper
- Ruler
- Pen/pencil
- Variable star image print outs

#### Outline

You will look at pulsating variable stars and see how their brightness varies, as if it had a heartbeat.

Using images taken of these stars you will be asked to estimate their magnitude (brightness), figuring out the maximum and minimum. Then plotting a graph to calculate the stars cycle.

#### Procedure:

**1**

Arrange the images of star X Cyg in time order, using the Julian Day calendar.

**2**

Using the stars around as reference, estimate the stars magnitude in the first image.

**3**

Record your answer in a table of Julian Days and magnitude.

Online Observatory: [onlineobservatory.eu](http://onlineobservatory.eu)

The online observatory collaboration consists of the following partners:

Baldone Observatory, Brorfelde Observatory, Cardiff University, Harestua Solar Observatory, Helsinki Observatory



4

Repeat the process for each of the following images.

5

Plot a graph of X Cyg's changing magnitude over time and calculate the stars cycle.

### Assessment:

- Does the star have a regular cycle?
- What is the cycle period?
- Compare your answers to others, how have your estimates differed? What is the variation in results? What common features do your graphs have?

### Activity 2:

1

Look at the images provided, can you locate the variable star in them.

2

Circle the variable star (on each image).

3

You will be shown an image of the stars with magnitudes labelled.

4

From the images estimate the maximum and minimum magnitude of the .



5

Without plotting a graph, estimate the stars cycle.

### Assessment:

- You will be shown the stars magnitude-time graph, how many cycles are shown?
- Compare your max. and min. magnitudes, how accurate was your estimate?
- How precise were your visual estimates?
- Justify why this is or is not a reasonable method for calculating variable stars cycles

Based on the Chandra activities, available at [http://chandra.harvard.edu/edu/formal/variable\\_stars/](http://chandra.harvard.edu/edu/formal/variable_stars/)