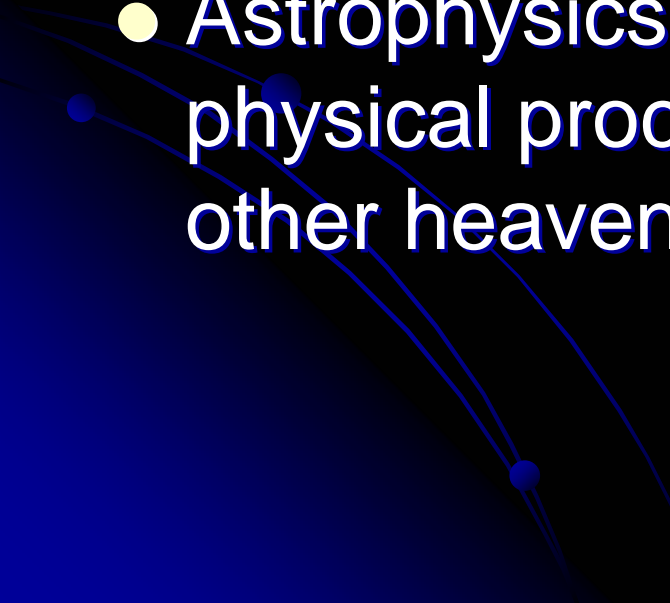


Computational Astrophysics

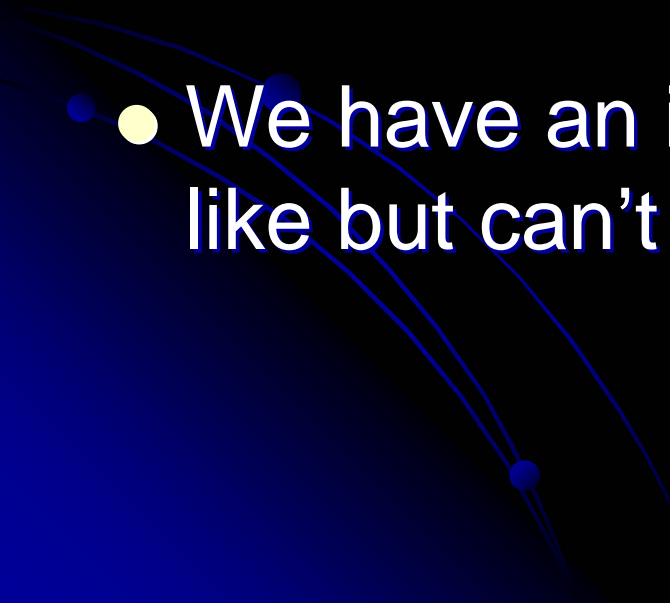
A brief overview
by Dr. Jennifer Cash



What is it?

- Computational = uses computers to help mathematically describe a complex system
 - Astrophysics = seeks to understand the physical processes at work in stars and other heavenly bodies
- 

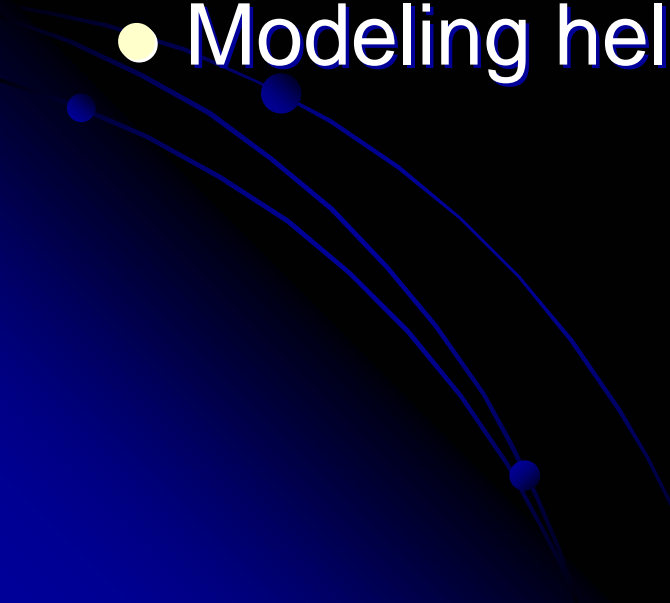
My work ...

- I study a particular type of binary star system where strong magnetic and gravitational fields control the flow of gas from one star to another
 - We have an idea of what they might be like but can't see up close to know for sure
- 

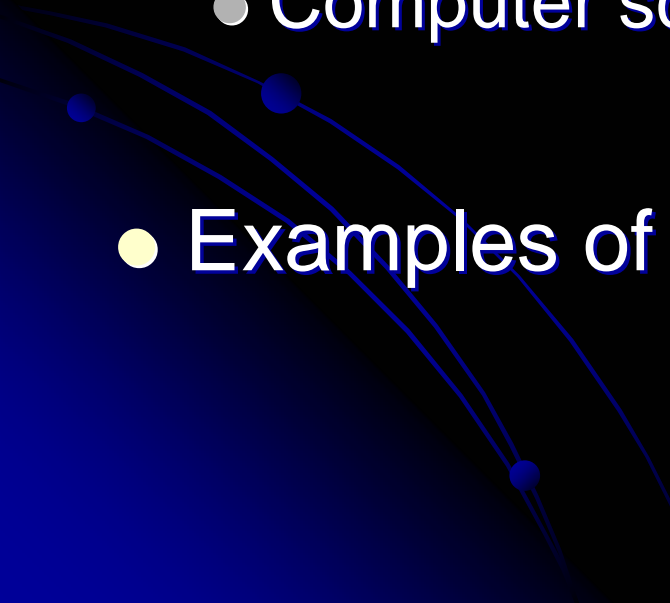
Magnetic CV (Polar)



Understanding Polars

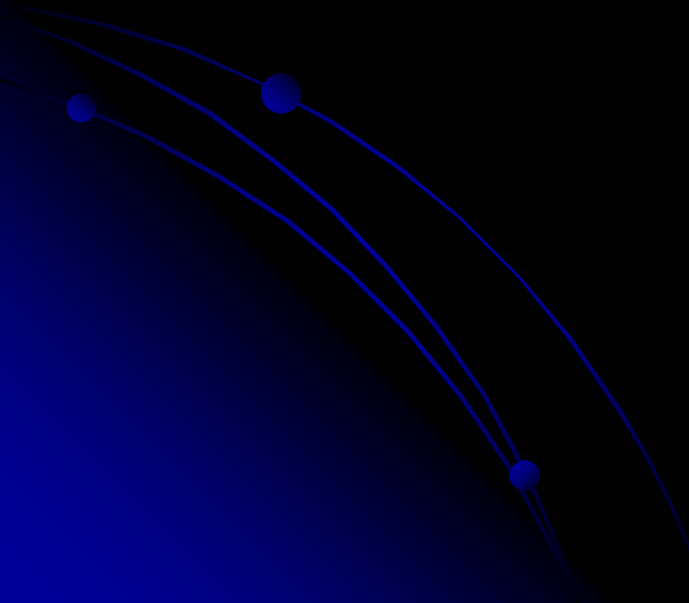
- Observations are very complex
 - Mathematical descriptions also very complex
 - Modeling helps join the two sides
- 

Multi-disciplinary

- This work can involve all of the following:
 - Physics
 - Astronomy
 - Mathematics
 - Computer science
 - Examples of students working with me ...
- 

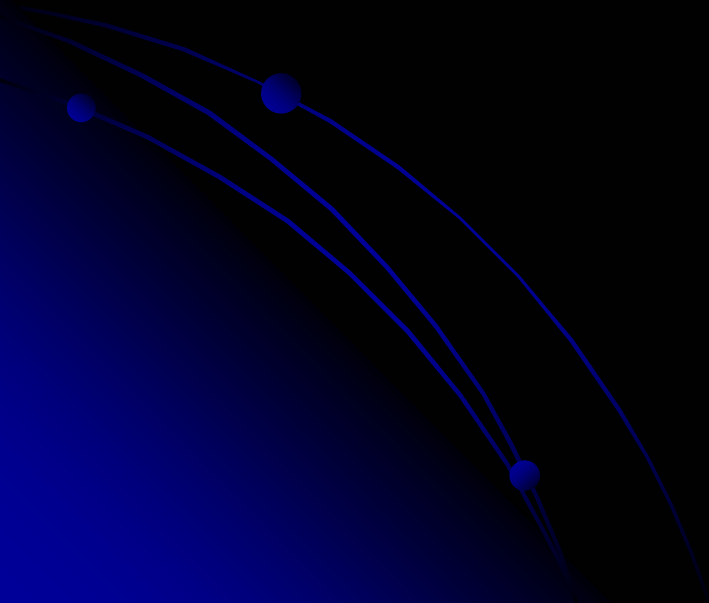
Hydrodynamic modeling

- Extension of my PhD work
- Study of how material flows from secondary to primary

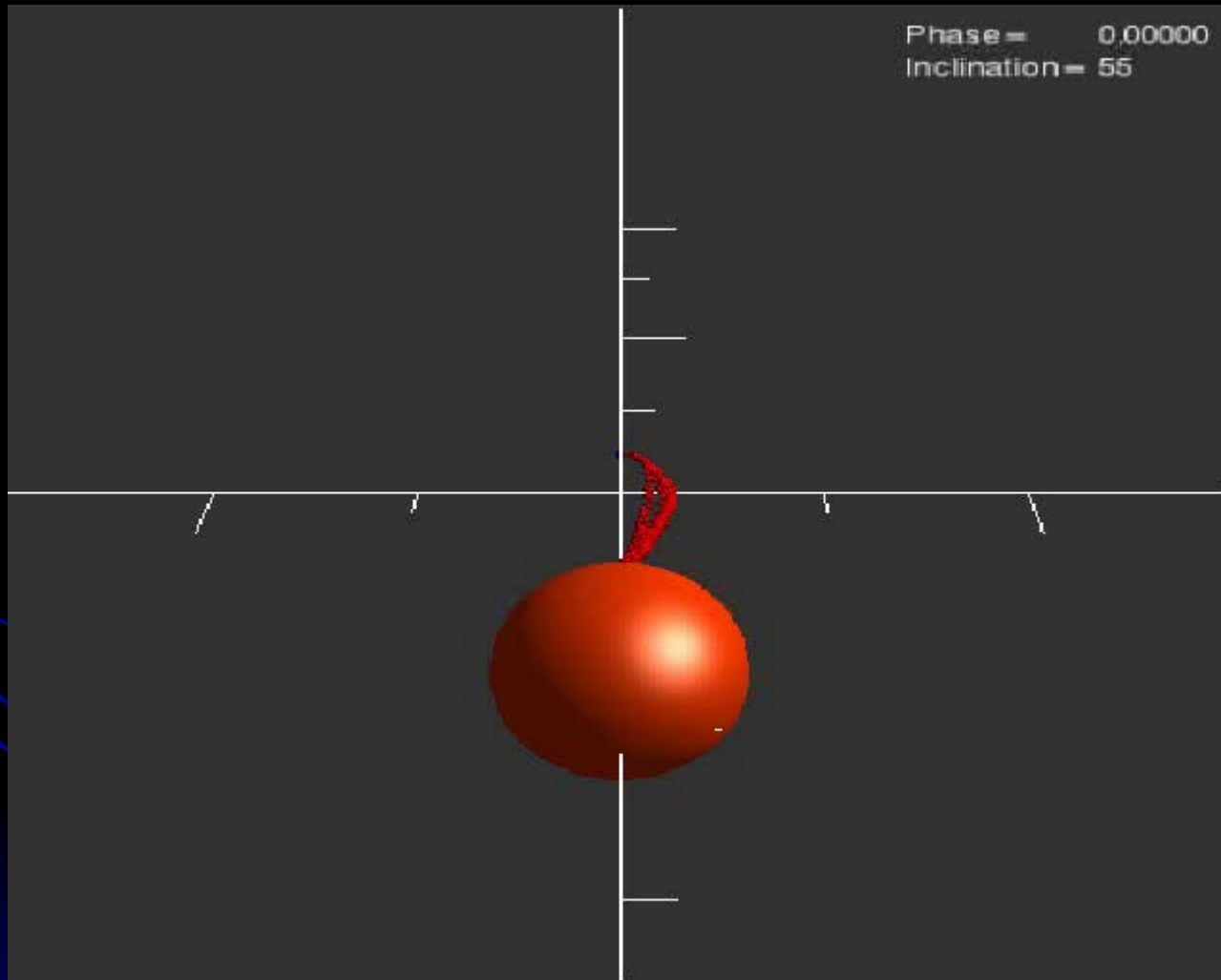


Visualization

- Turning model data into visual picture
- Program to interactively manipulate visualization

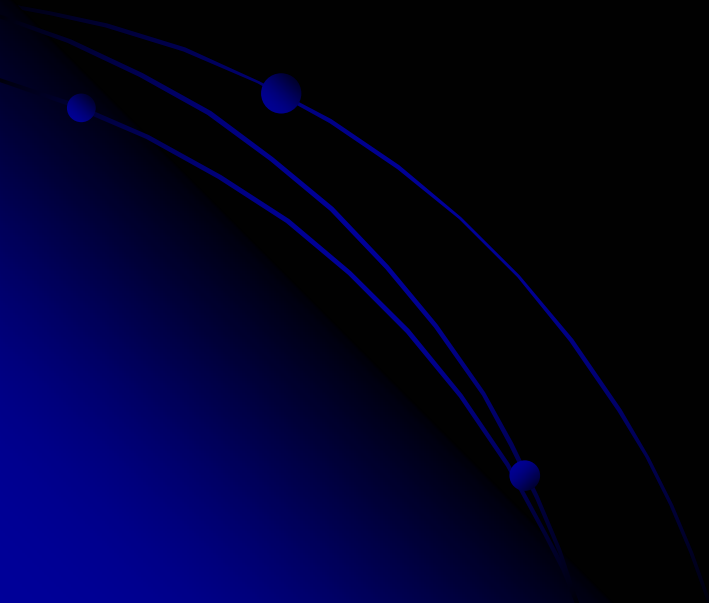


Example visualizations



Observational Comparison

- Eclipse light curves
 - Summer research student
- Radial velocity of spectral lines
 - New collaboration with Vanderbilt



Secondary star modeling

- In collaboration with LLNL
 - Looking at how gravitational distortion affects the structure of the star near the surface
 - SCSU portion, program to compare LLNL models to observational data
- 