

Speaker Contact Information

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- Charli Sakari: sakaricm@u.washington.edu
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- Paul Szkody: szkody@astro.washington.edu

Undergraduate Opportunities in Telescopes and Instrumentation at UW

Chris Laws

Joseph Huehnerhoff





Manastash Ridge Observatory

2015-11-6



2015-11-6



2015-11-6



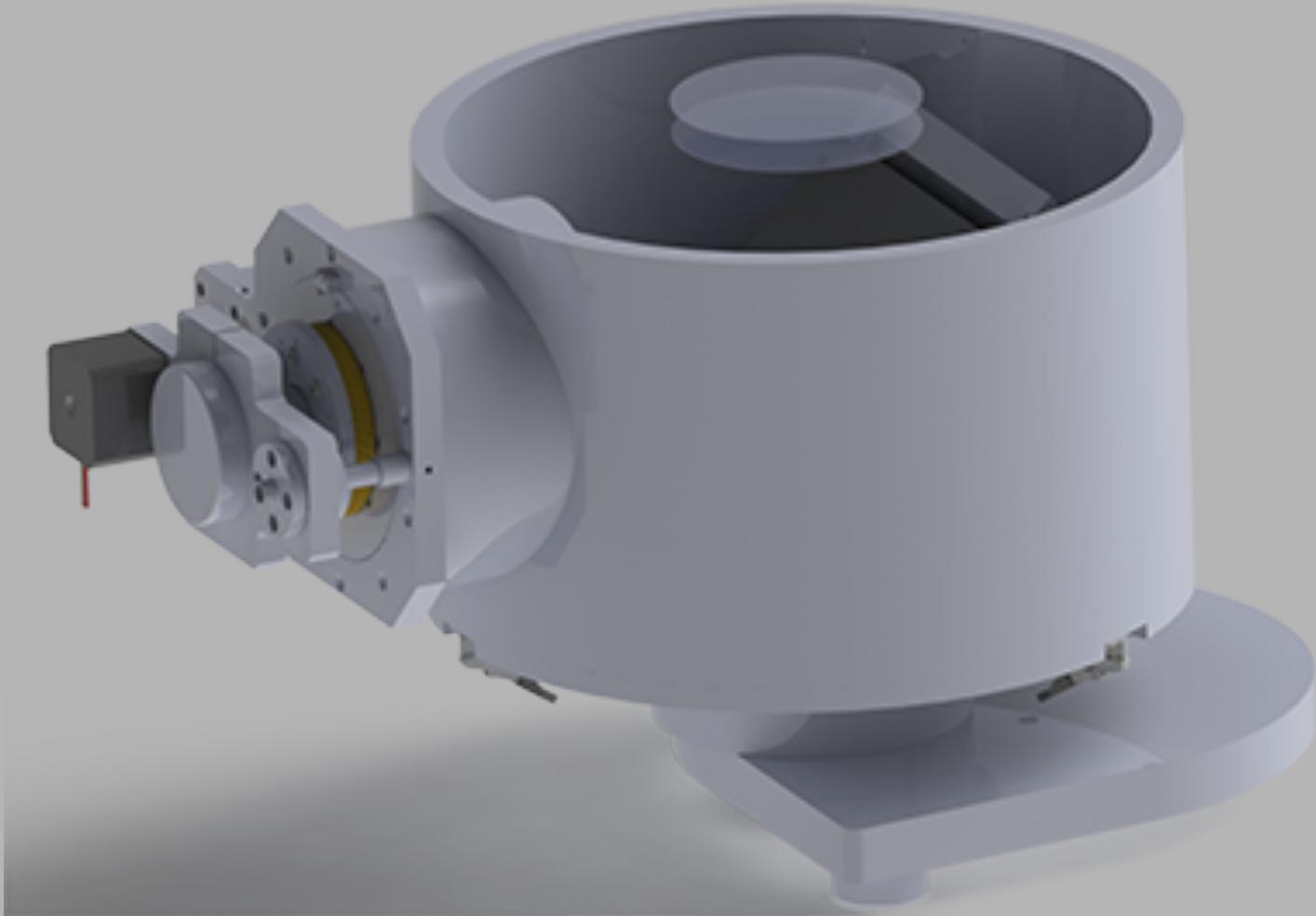
University of Washington
Department of Astronomy



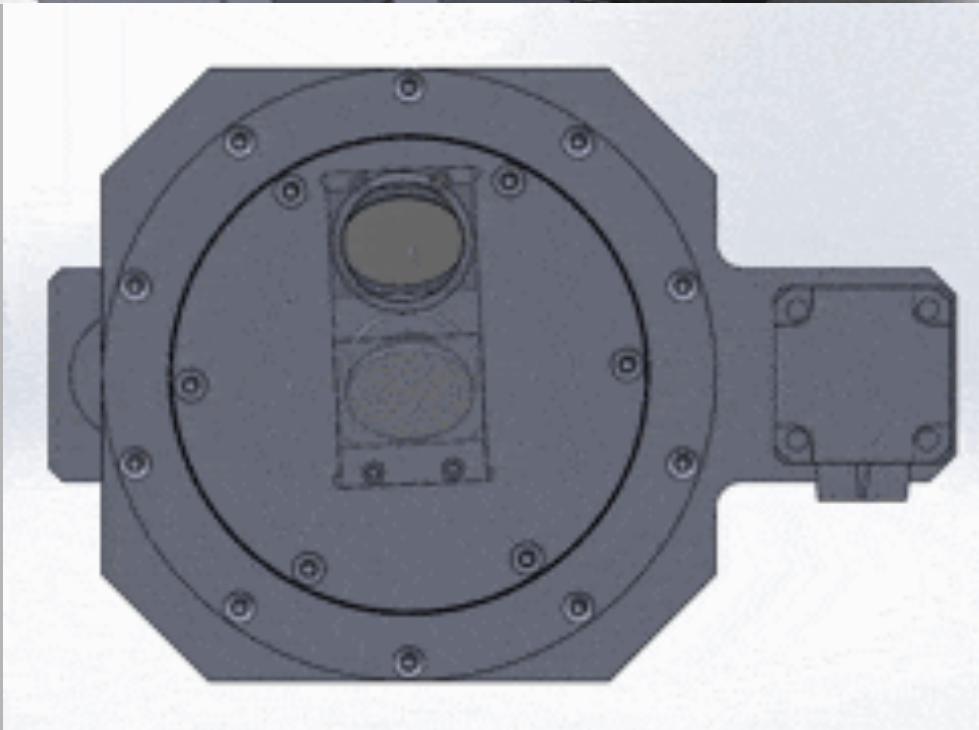
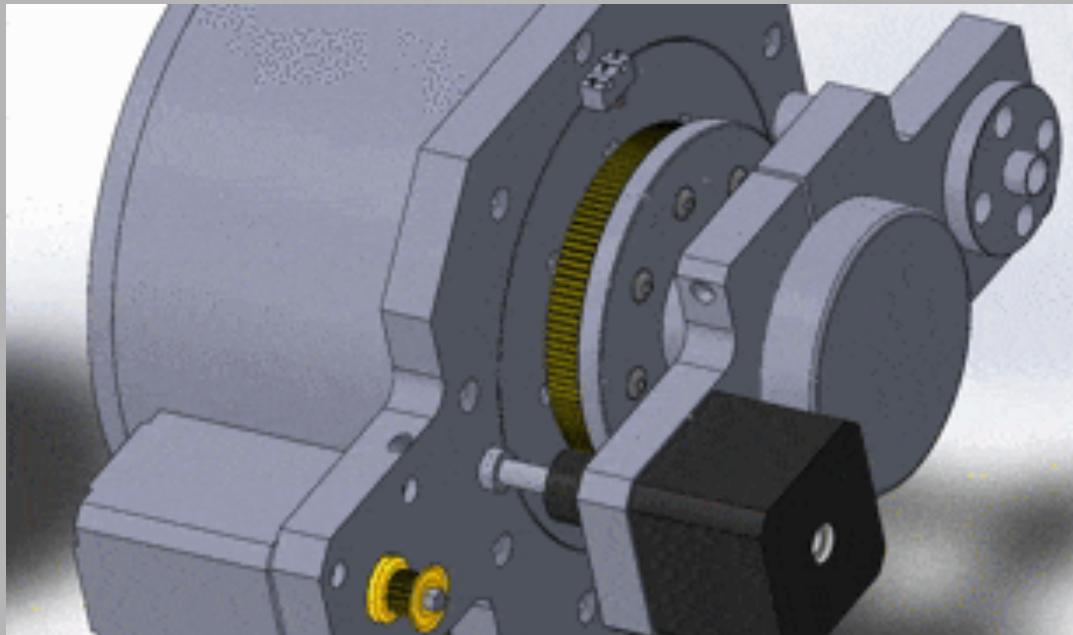
Astronomy Undergraduate Engineering Group

- Teach
 - Project Management – break into team
 - Industrial Skills
 - Professional Work Ethic
- MRO Projects
 - New Science Camera
 - Sustainability Upgrade
 - Guider Upgrade
 - TCC upgrade
 - Filter Wheel Replacement
- APO
 - Dome Flow Analysis 35m
 - Temp Sensor Replacement 25m
 - Summer Shutdown Support

<http://staff.washington.edu/jwhueh/AUEG/>

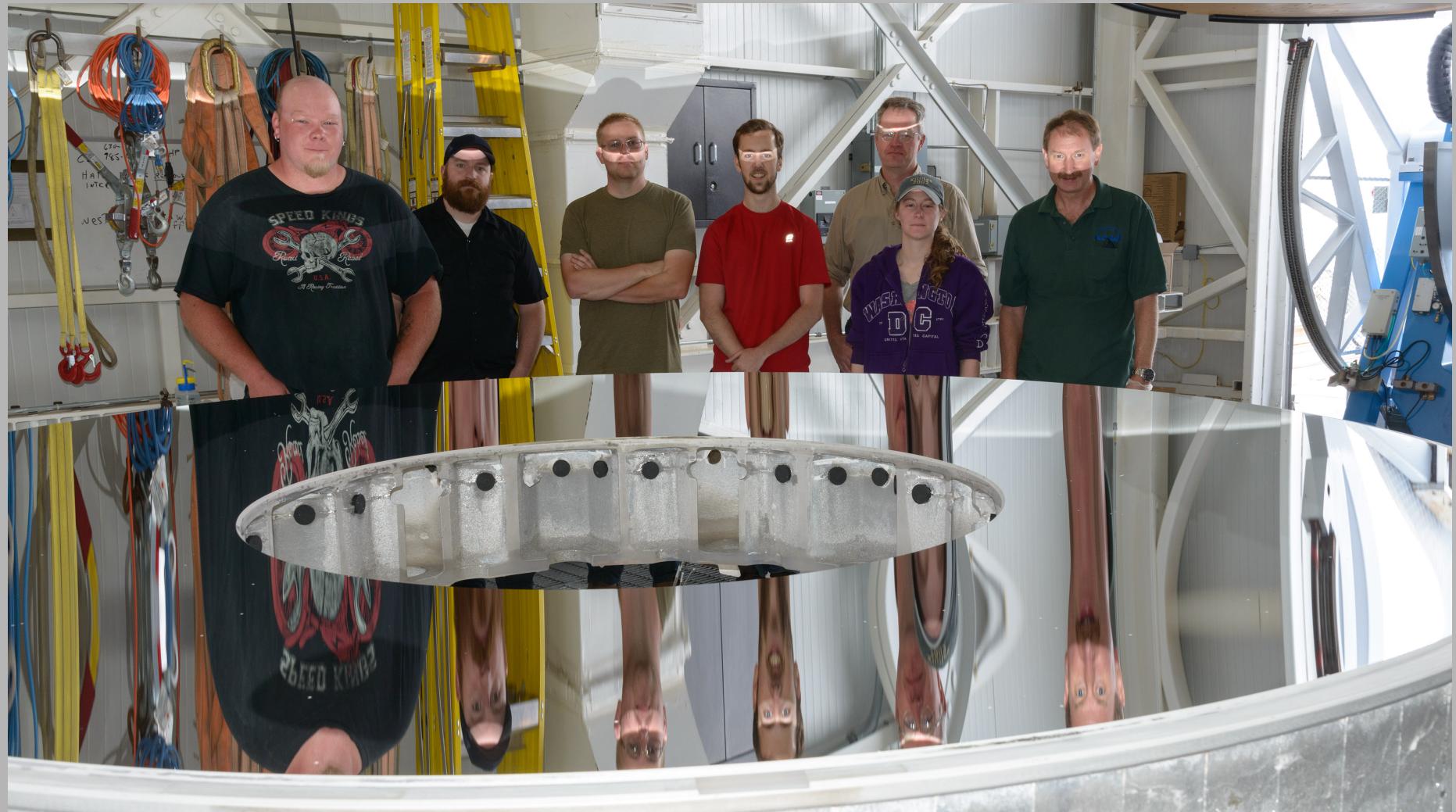


2015-11-6



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Fun with Mirrors

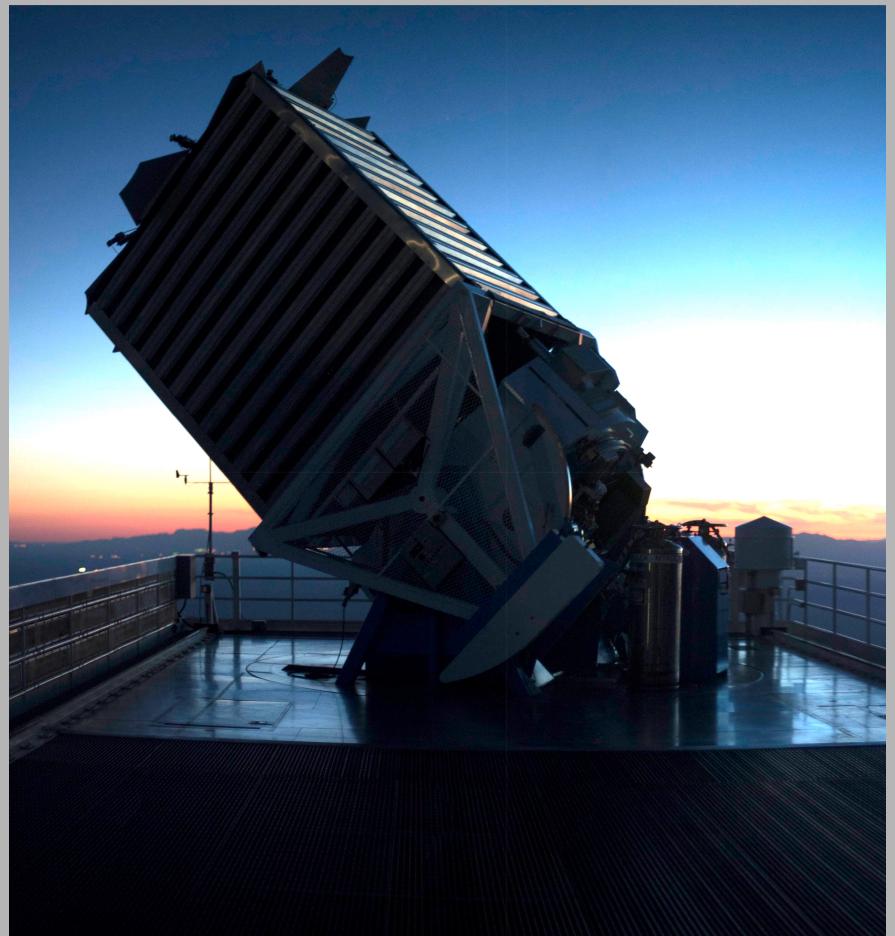


2015-11-6



2015-11-6

- Provide Outlet for usage of advanced skills
- SDSS Common Corrector Cleaning



Talk to Us to Get More Info

- If you are interested in Astronomical instrumentation and engineering come talk with Chris or myself about the current opportunities available.

Chris Laws - laws@astro.washington.edu

Joseph Huehnerhoff – jwhueh@uw.edu

Chemical Abundances of Globular Cluster Stars

Charli Sakari

Post-doctoral Research Associate
University of Washington



UNIVERSITY *of*
WASHINGTON



August 22, 2015

Everett Astronomical Society

Charli Sakari

Distant GCs



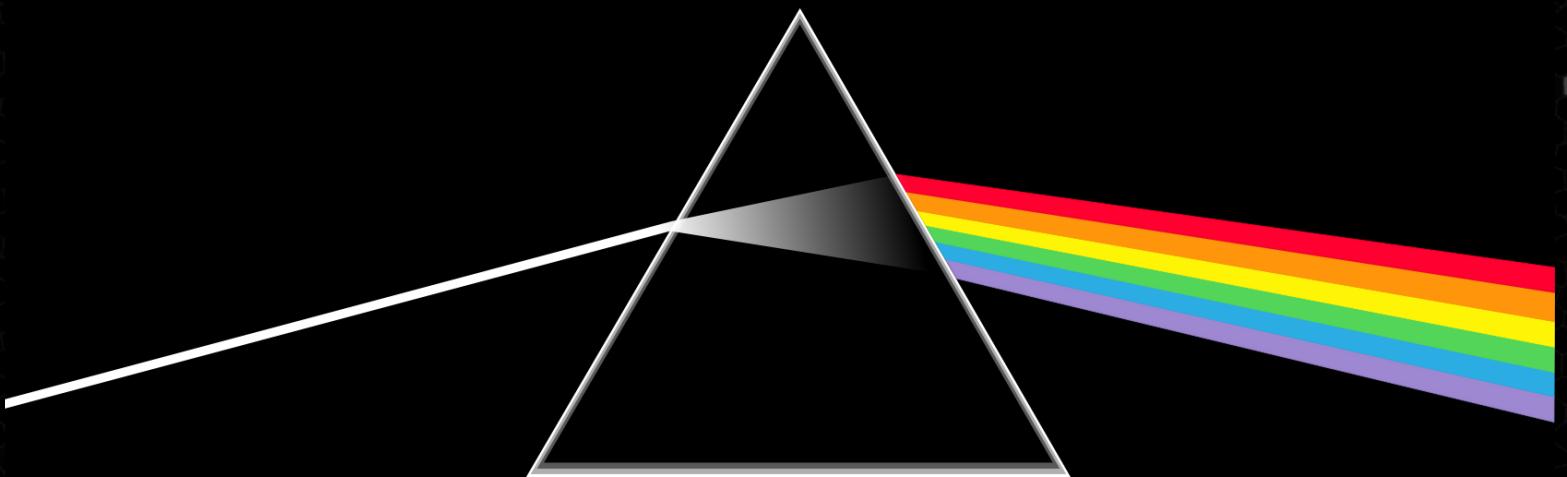
NGC 1407—Image from Harris et al. 2006

Everett Astronomical Society

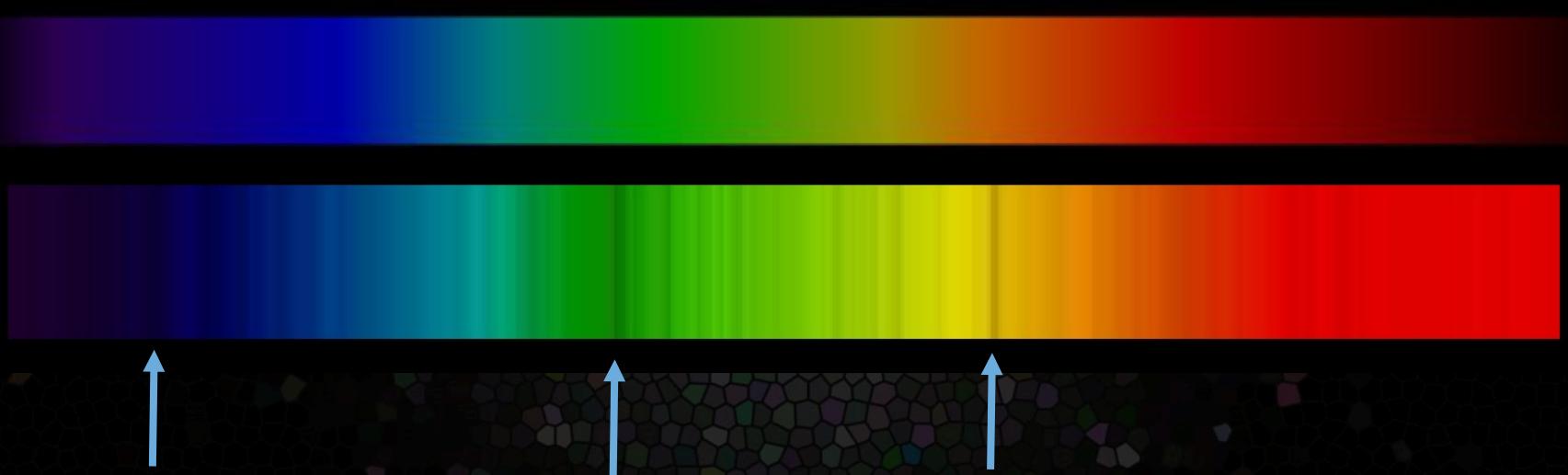
August 22, 2015

Charli Sakari

Spectroscopy



Spectroscopy



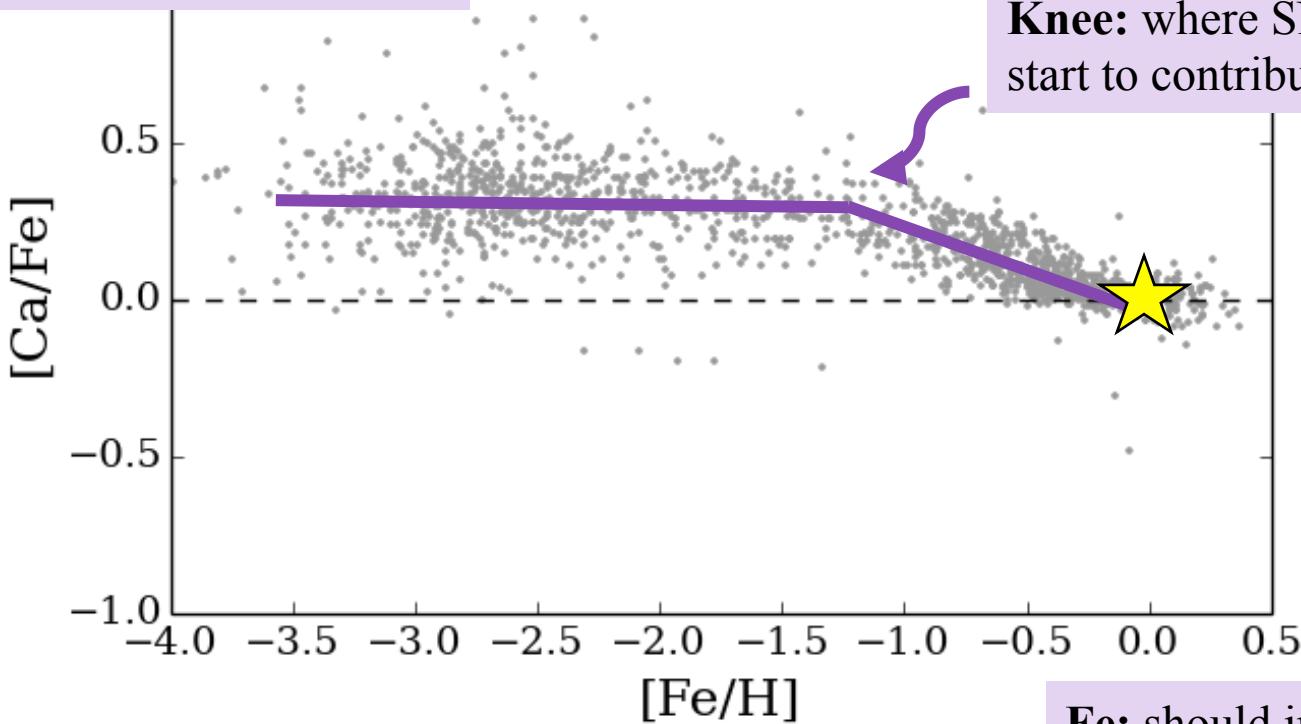
Dark bands = absorption lines

Chemical Tagging

Ca: massive stars

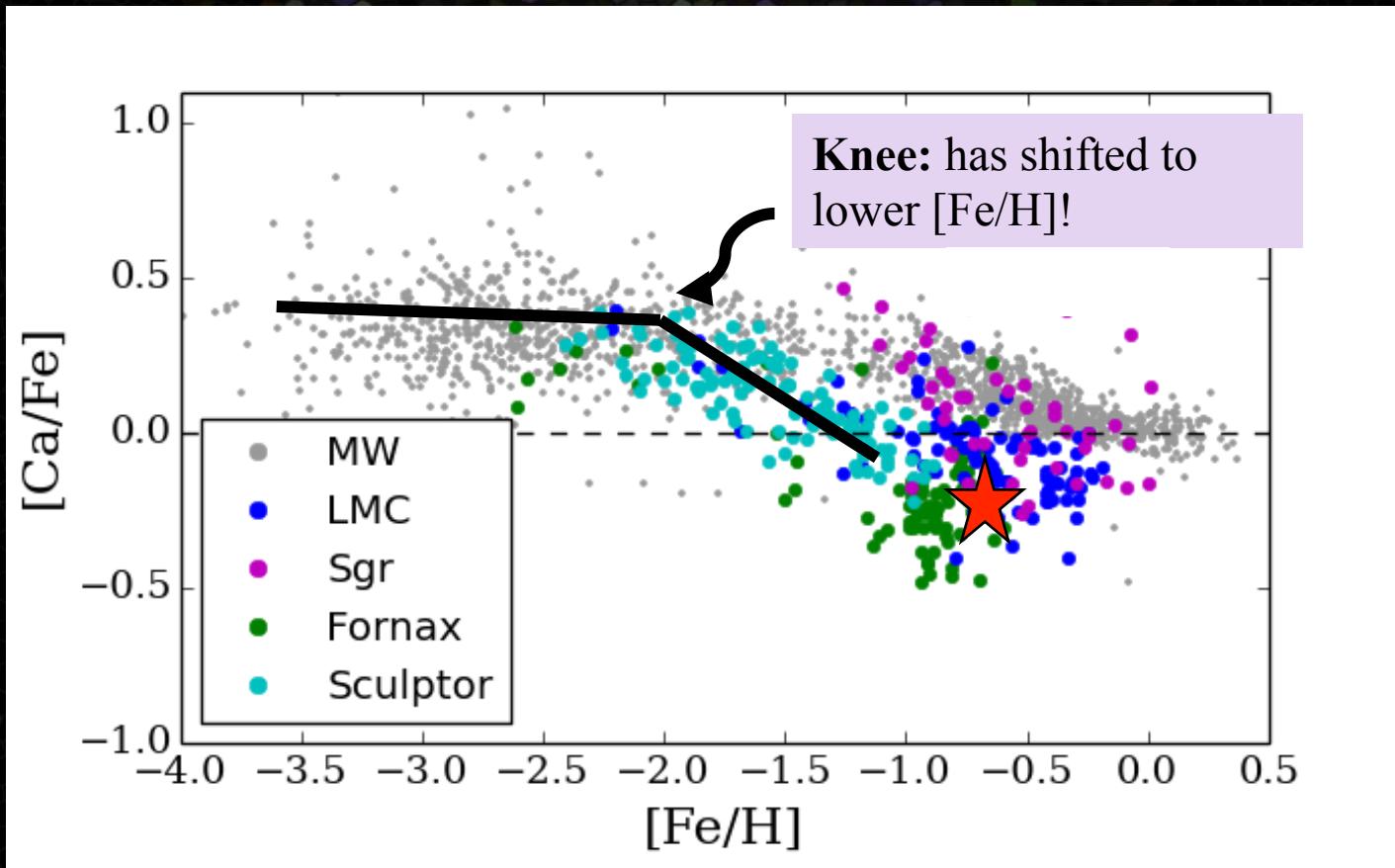
Fe: massive and low mass stars

Knee: where SNe Ia start to contribute



Fe: should increase over time

Chemical Tagging

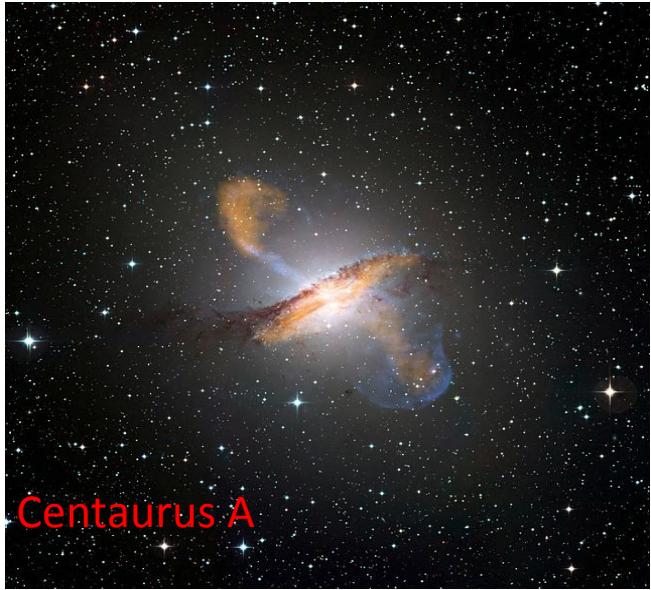


The Romulus Simulations

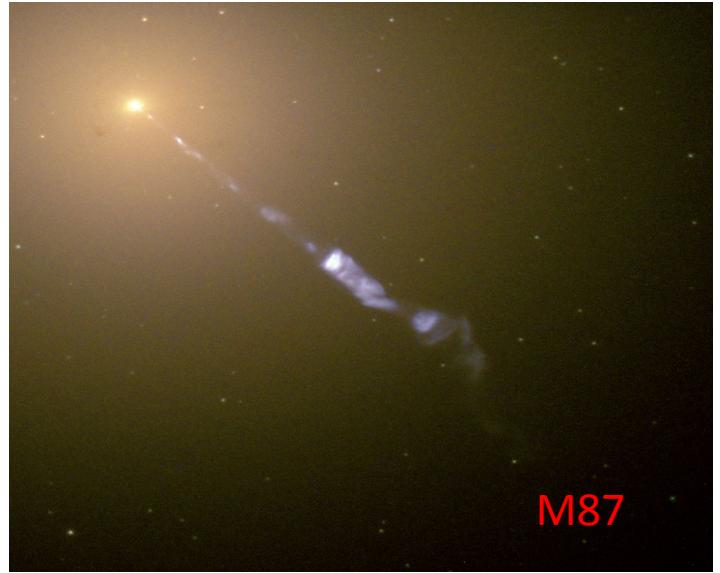
Studying the Co-Evolution of Galaxies
and Supermassive Black Holes



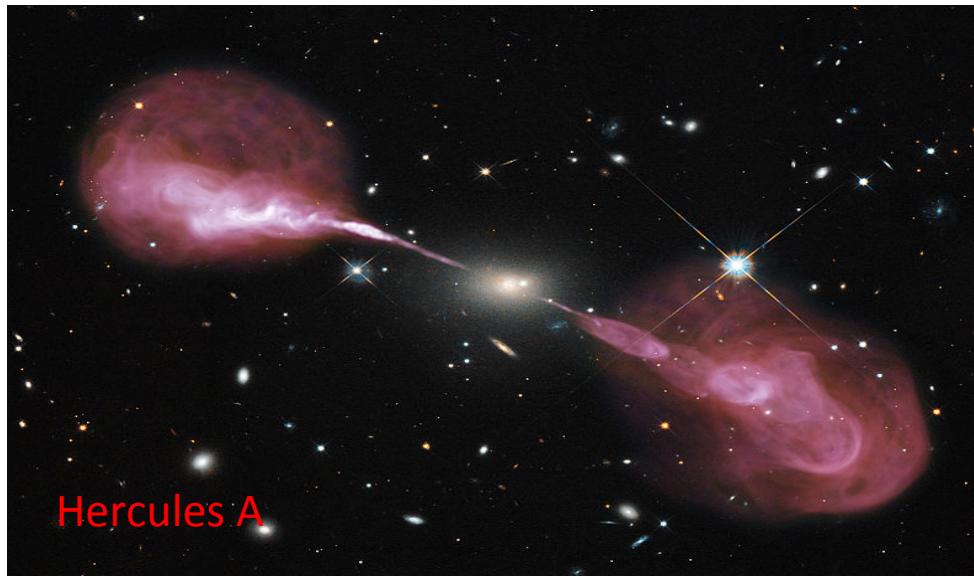
Black Holes and Their Galaxies



Centaurus A

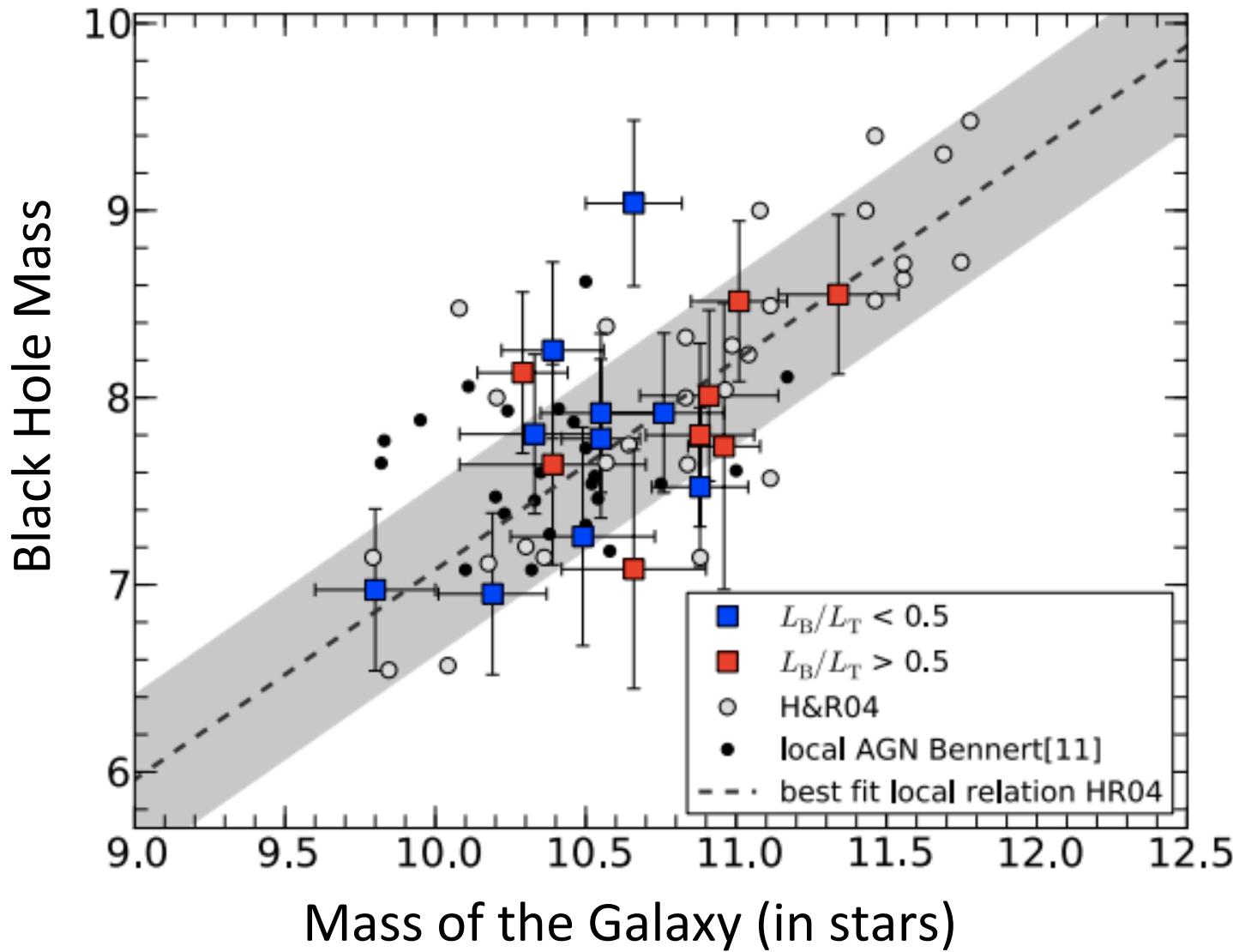


M87

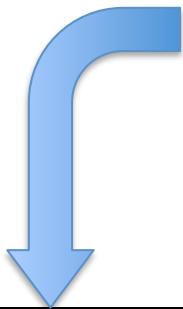


Hercules A

Black Holes and Their Galaxies

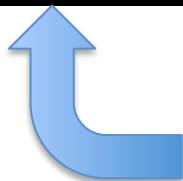
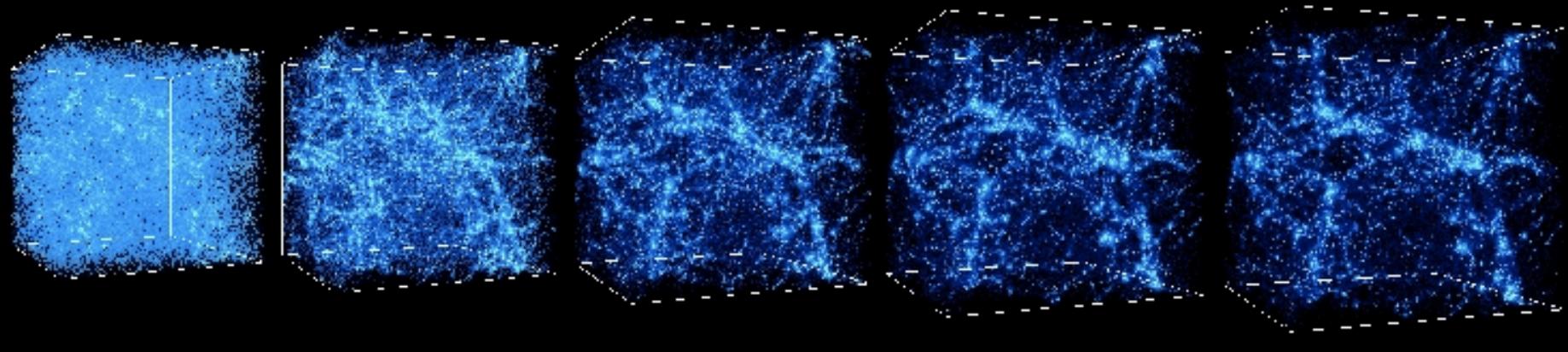


Cosmological Simulation Basics

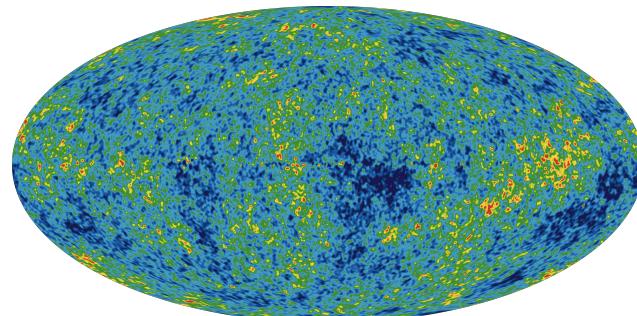


Physics

- ✓ Gravity
- ✓ Hydrodynamics
- ✓ Star Formation, Supernovae
- ✓ Supermassive Black Holes



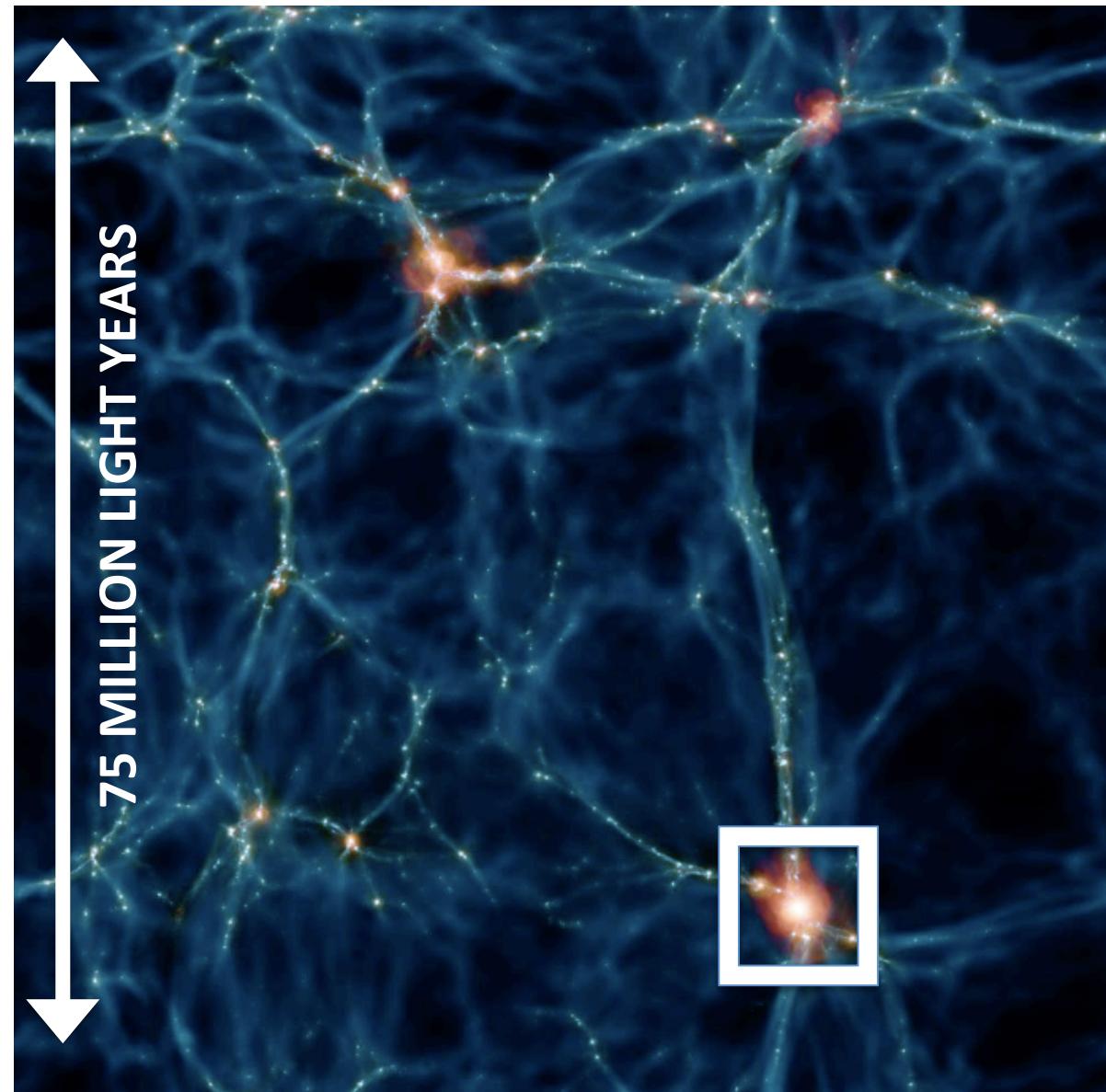
Initial Conditions





The Romulus Simulations

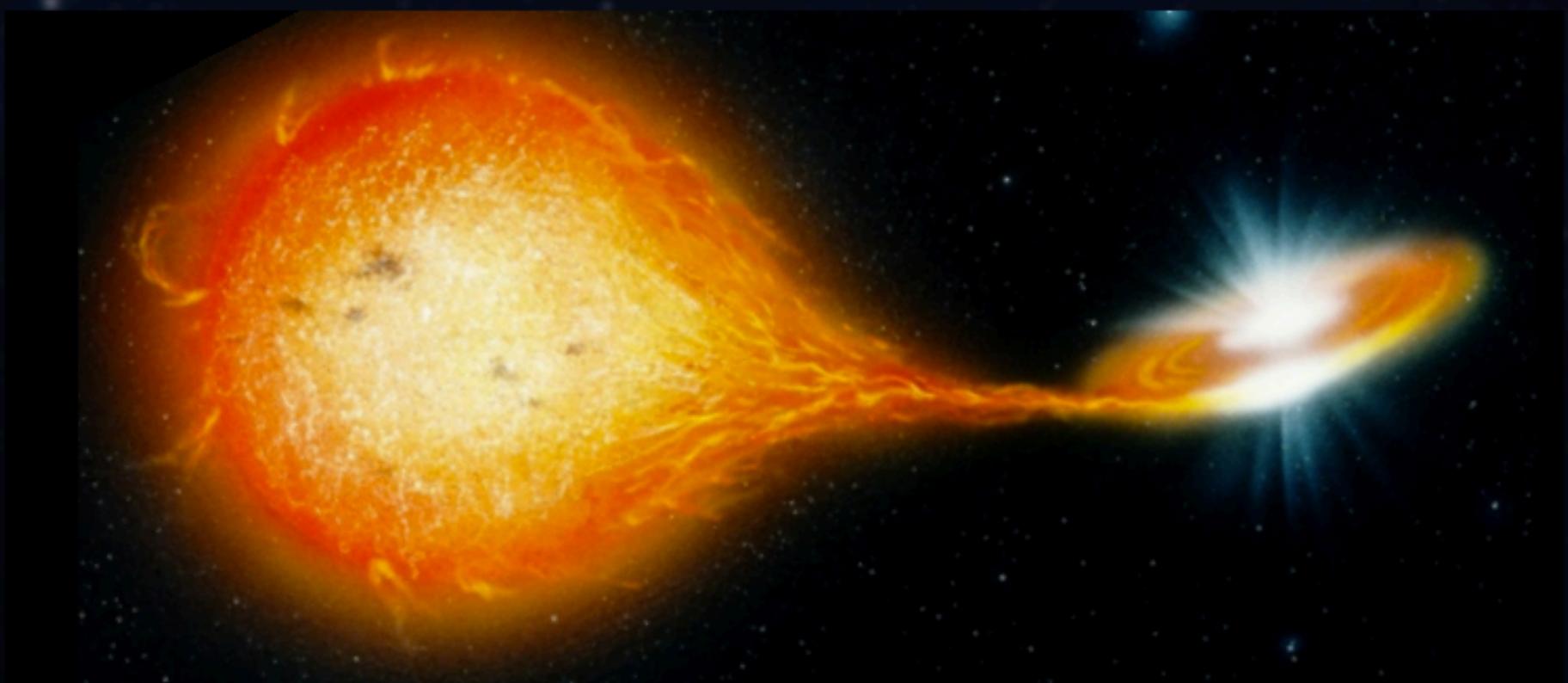
- ✓ High Resolution
- ✓ Well constrained physics
- ✓ New Supermassive Black Hole Physics



Thorne-Żytkow Objects: The Weirdest Stars in the Universe

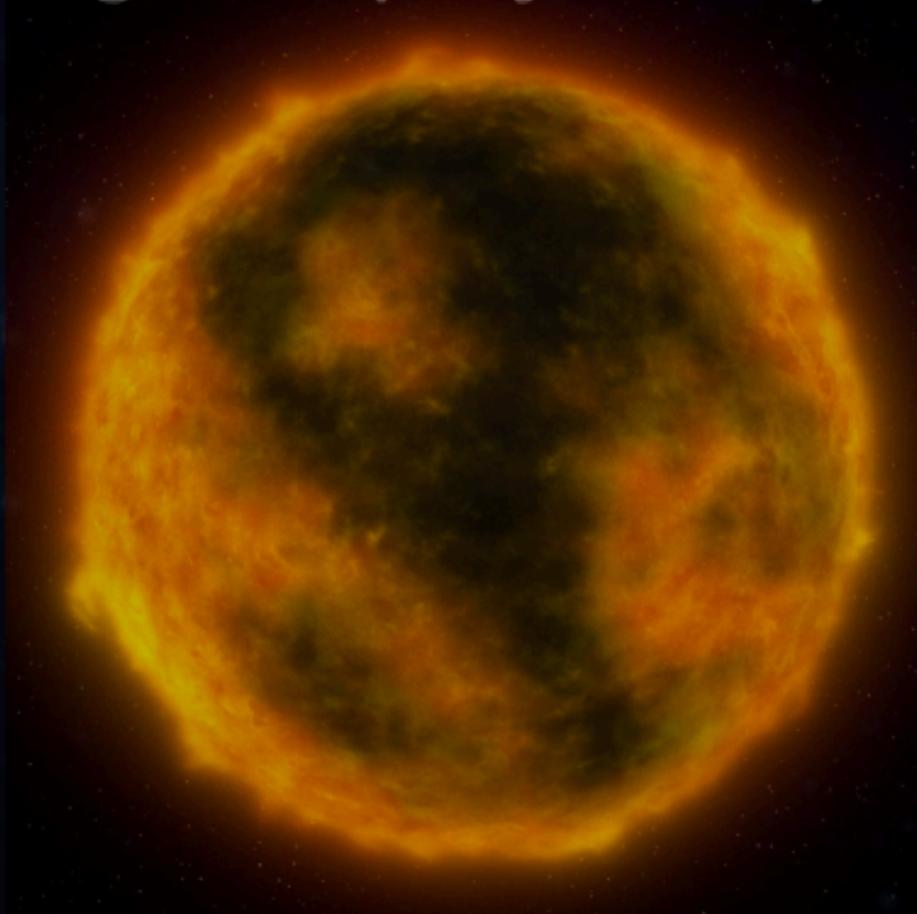
Emily Levesque

emsque@uw.edu



11.20.2015

Thorne-Żytkow Objects (TŻOs) are a theoretical class of star: a neutron star “core” surrounded by a large cold puffy envelope.

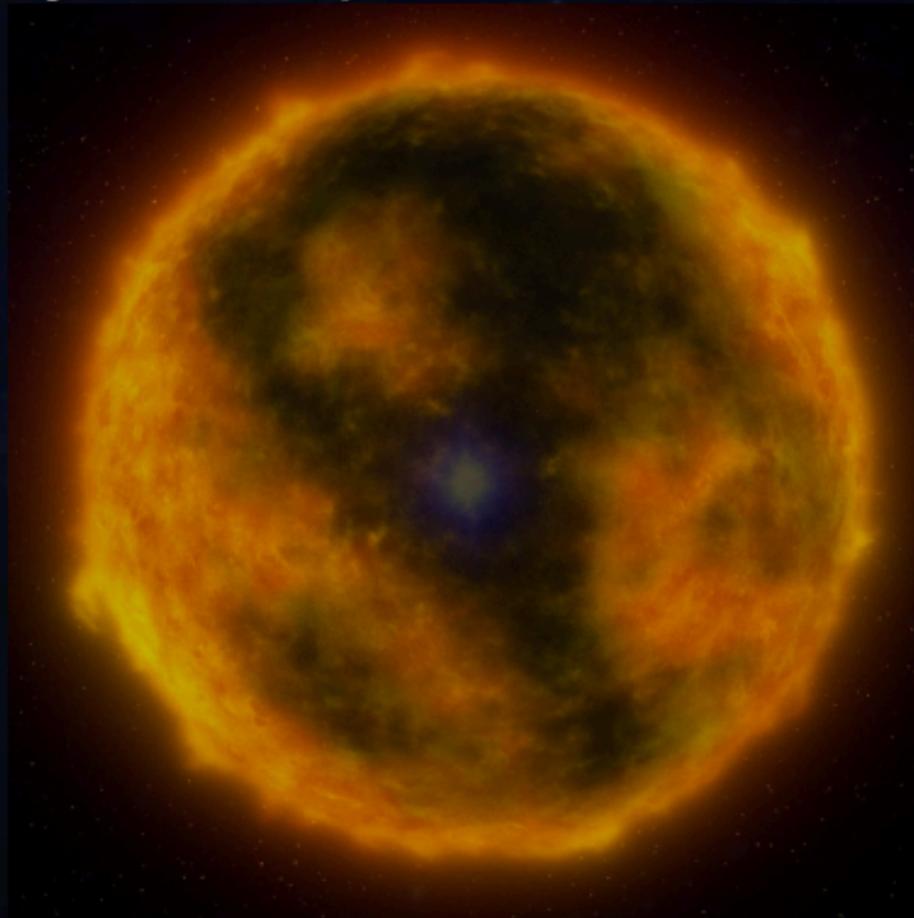


red supergiant



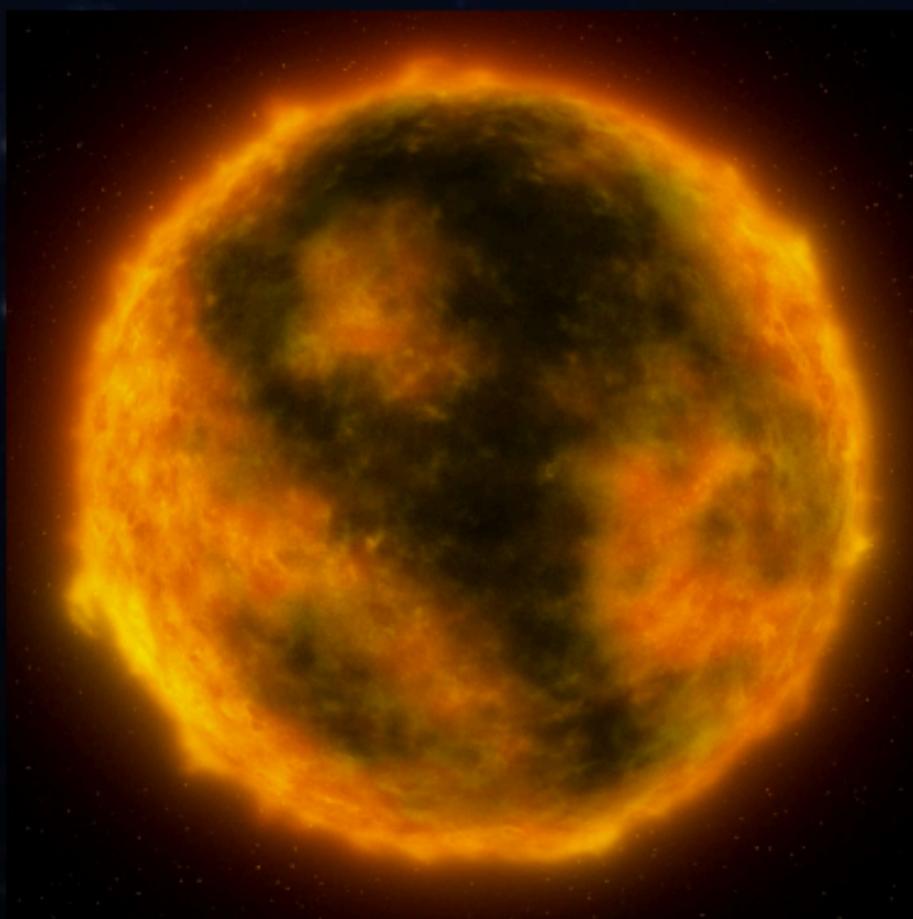
neutron star

Thorne-Żytkow Objects (TŻOs) are a theoretical class of star: a neutron star “core” surrounded by a large cold puffy envelope.

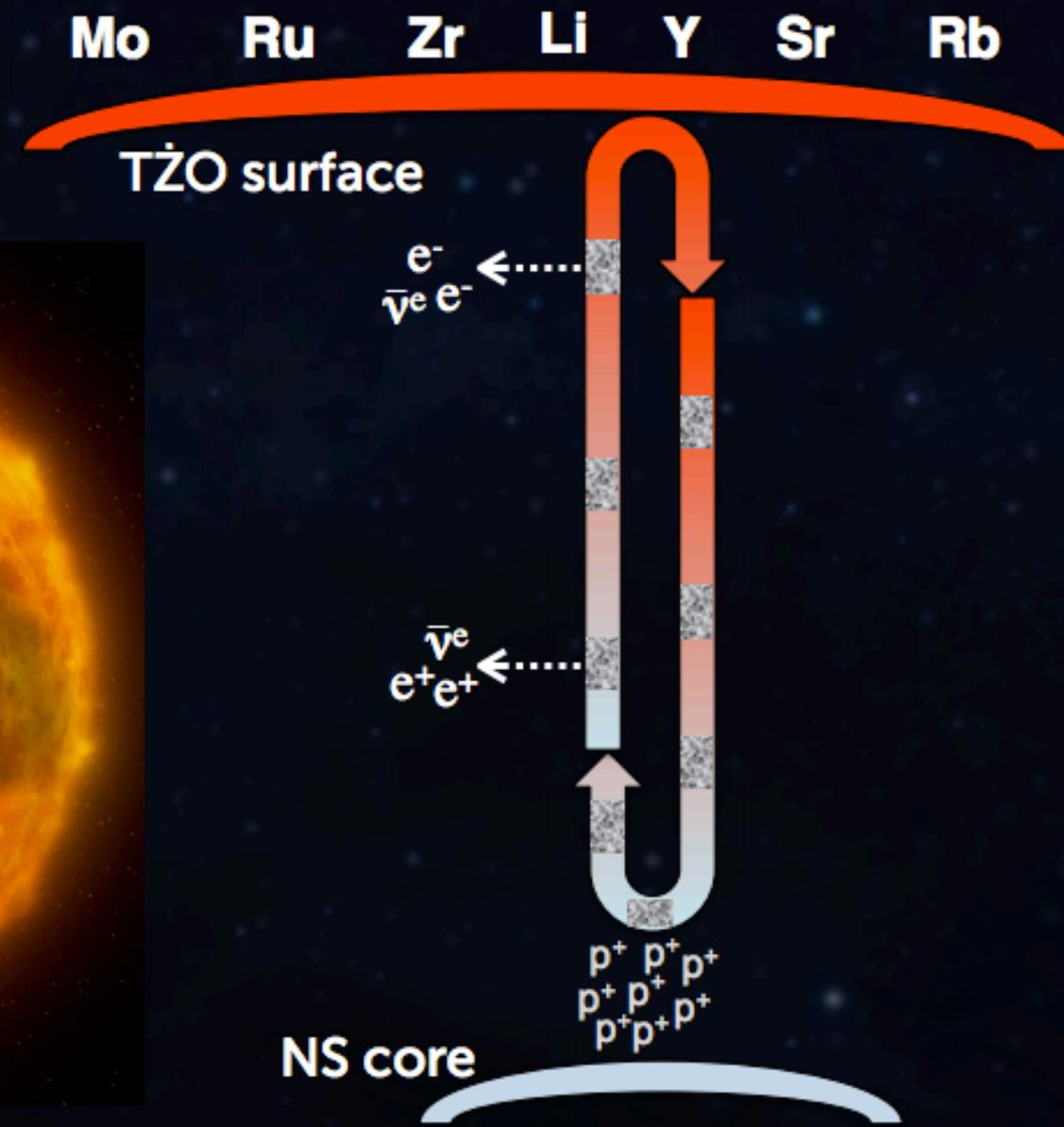
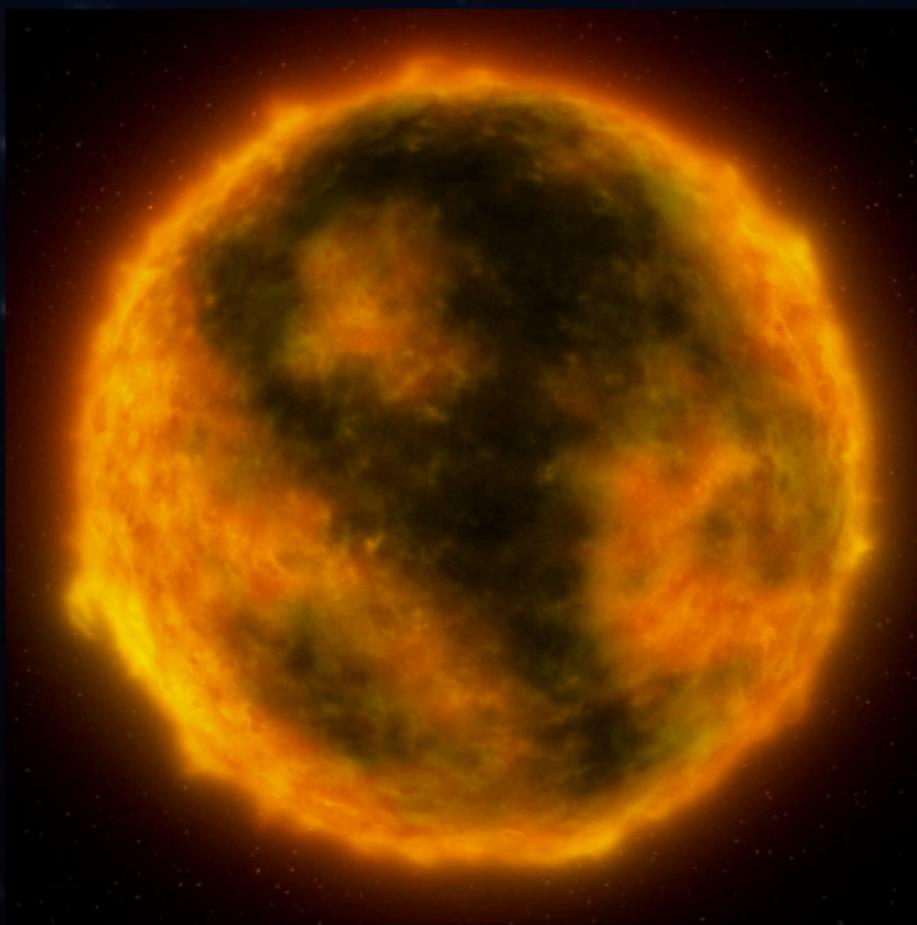


For years TŻOs were just a theory;
nobody had ever observed one.

T_ZOs look exactly like red supergiants...
almost!



T $\ddot{\text{Z}}$ Os look exactly like red supergiants...
almost!



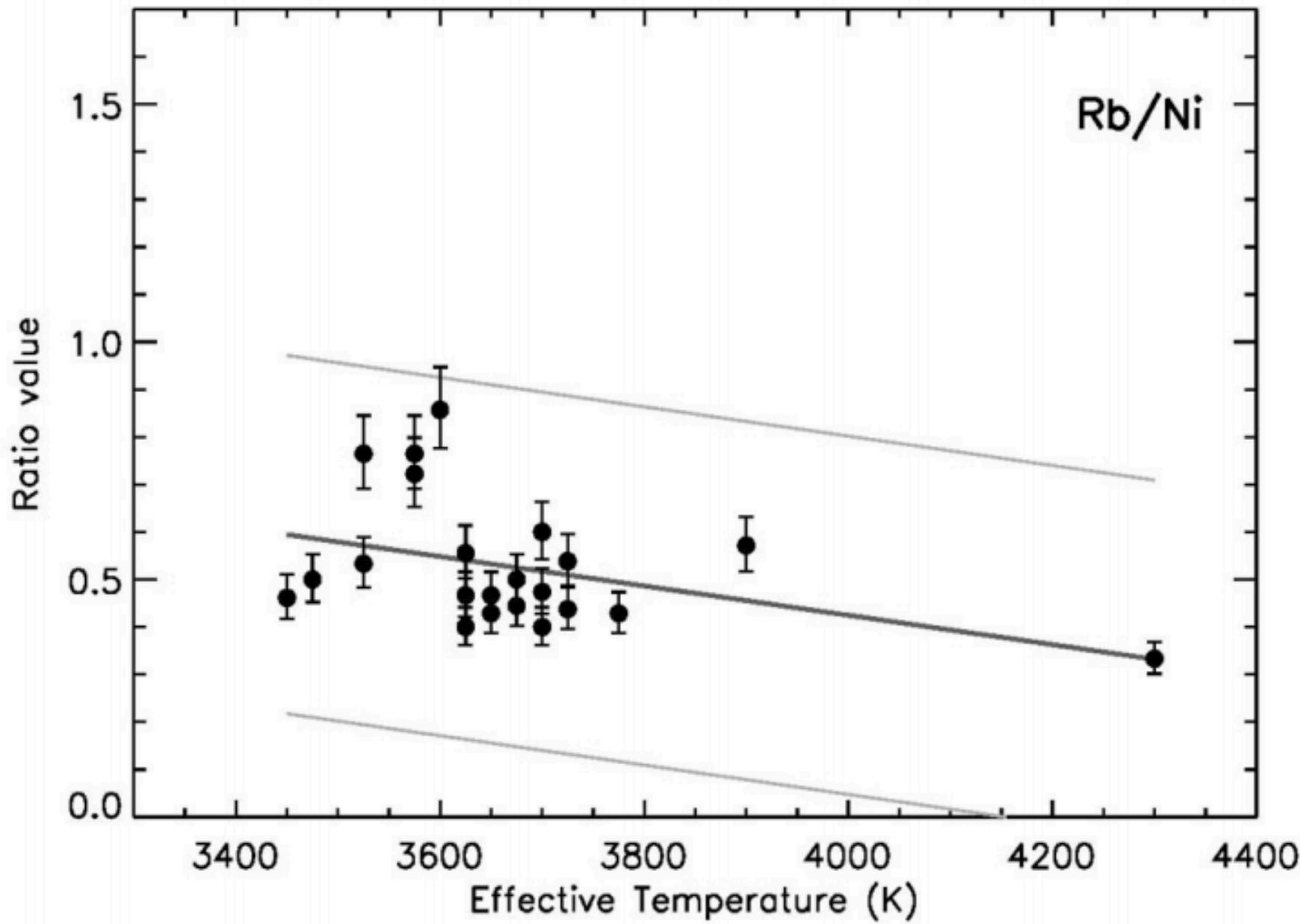
TŻOs look exactly like red supergiants...

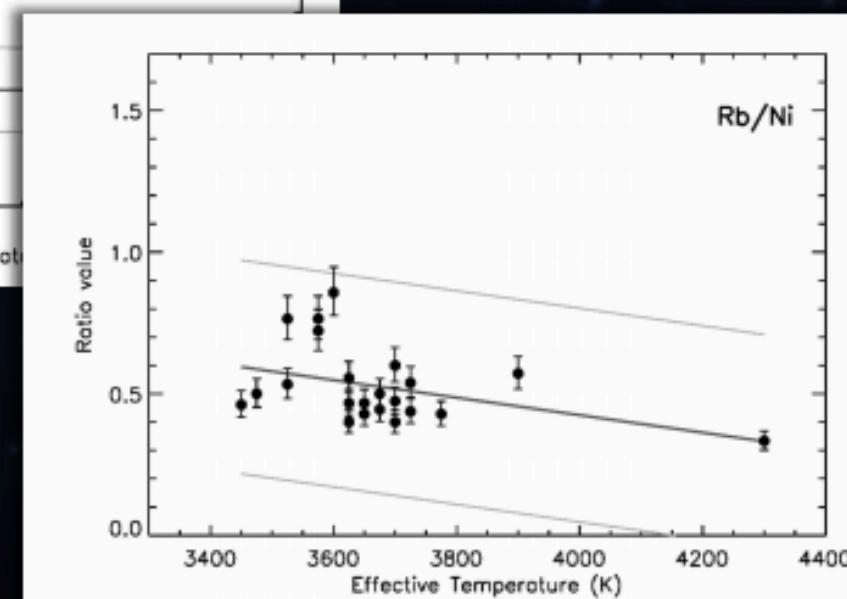
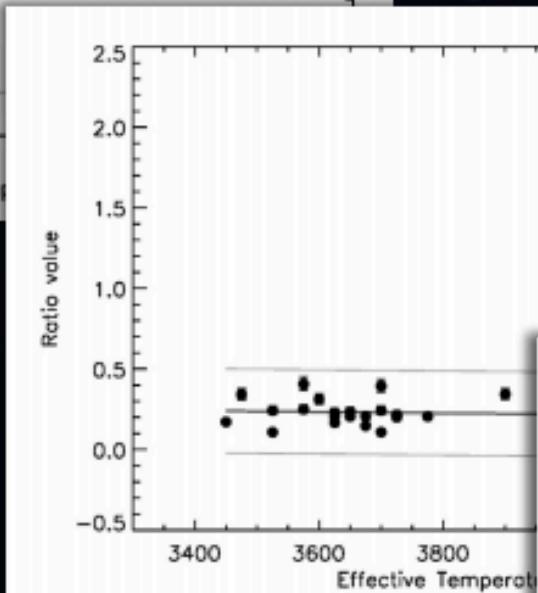
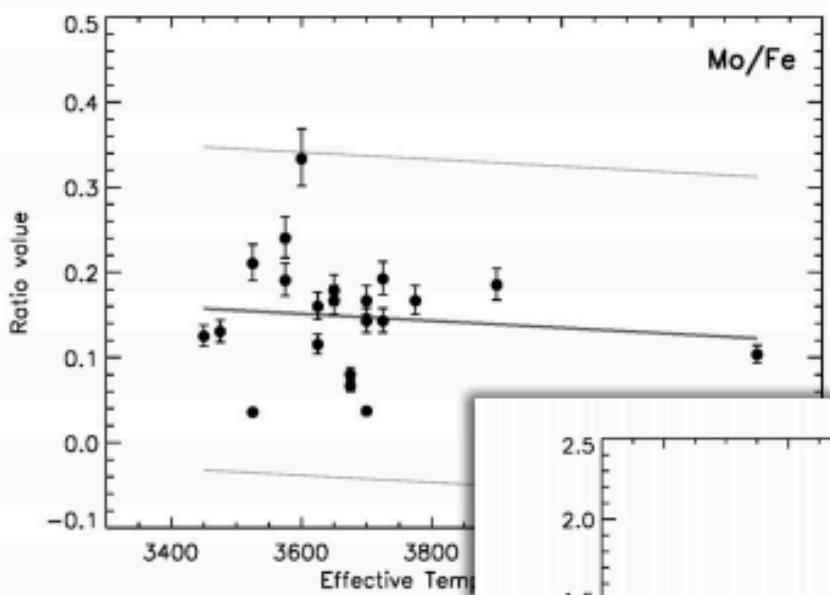
almost

A search for TŻOs: high-resolution spectroscopy of RSGs in nearby galaxies

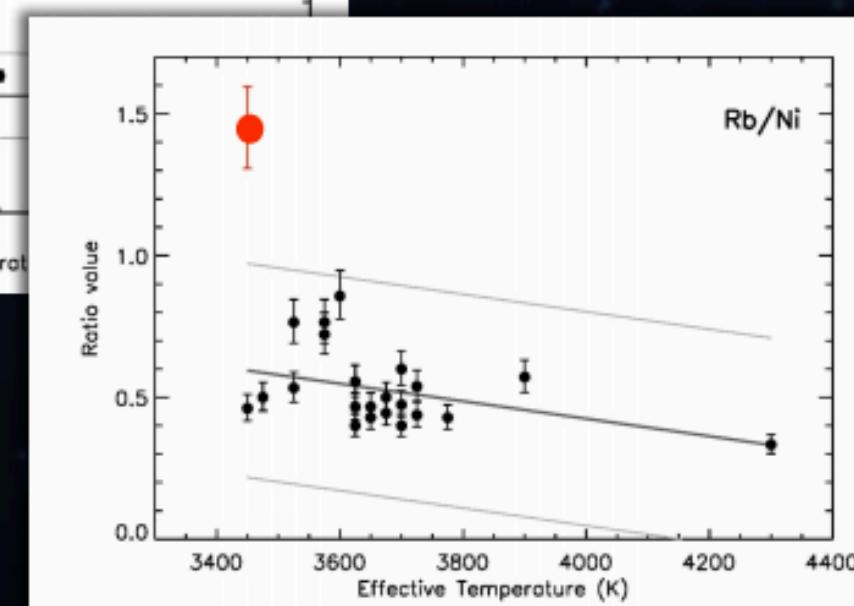
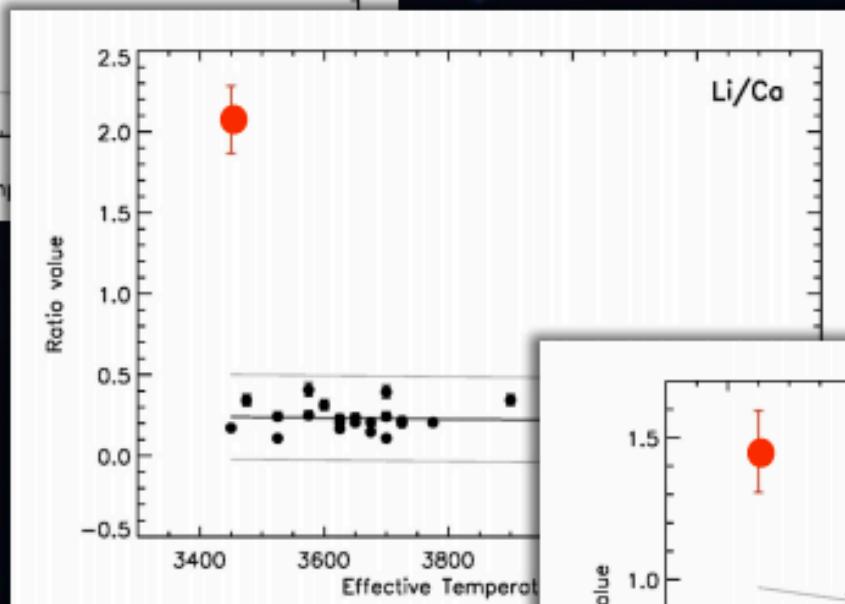
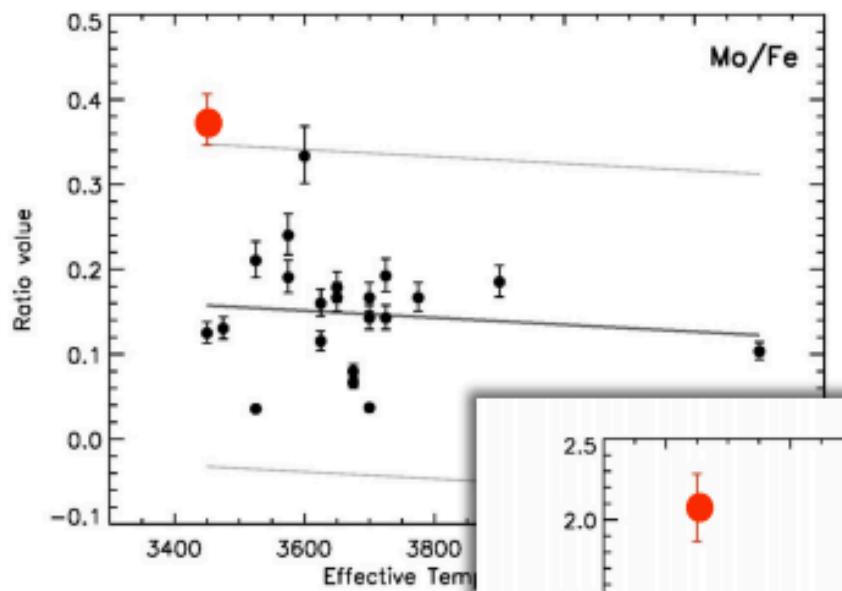


NS core $r^{p^+p^+p^-}$



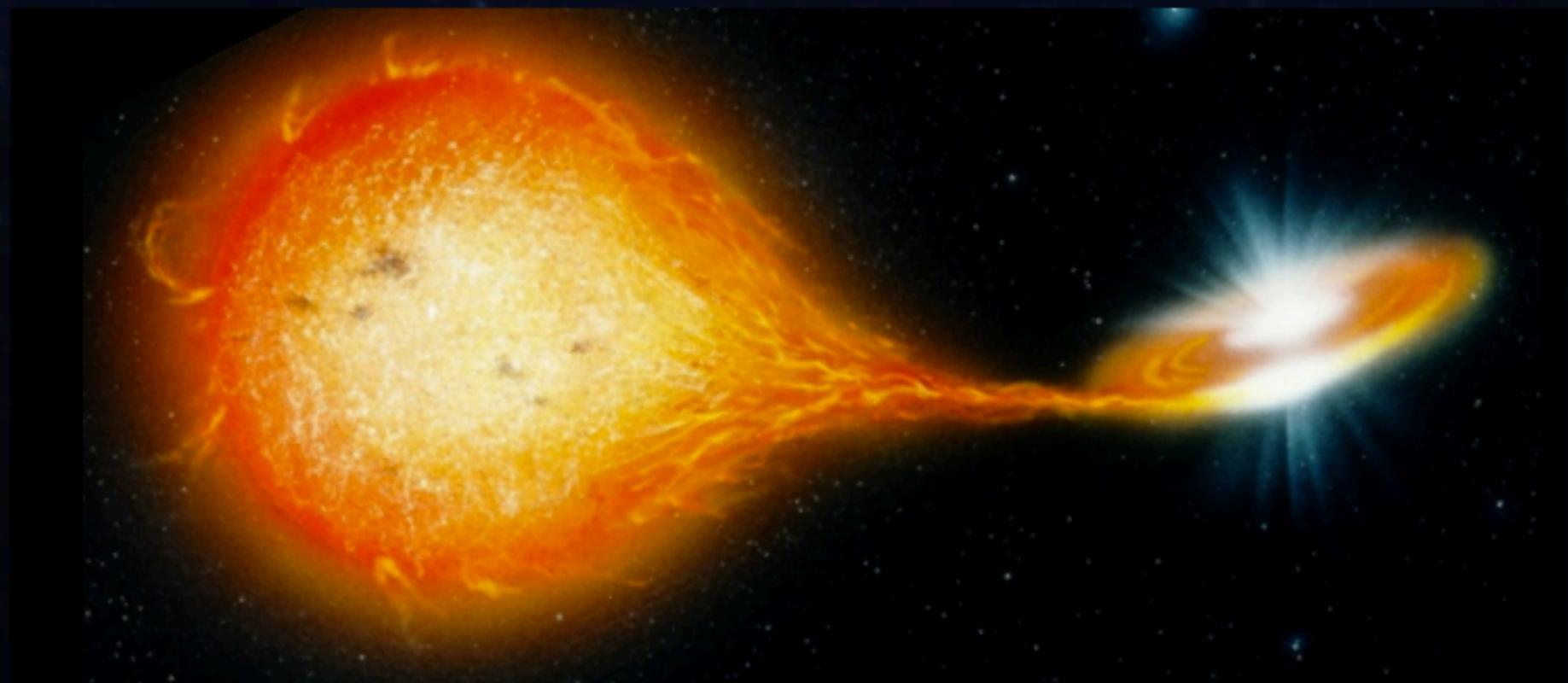


TZO candidate!



The existence of T \ddot{Z} Os would have profound implications for astronomy.

- completely new model of stable stellar interiors
- a new fate for massive binary systems
- new ways to make Li and heavy elements in our universe



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"Extraordinary claims require extraordinary evidence."

-the Sagan Standard

The existence of TŻOs would have profound implications for astronomy.

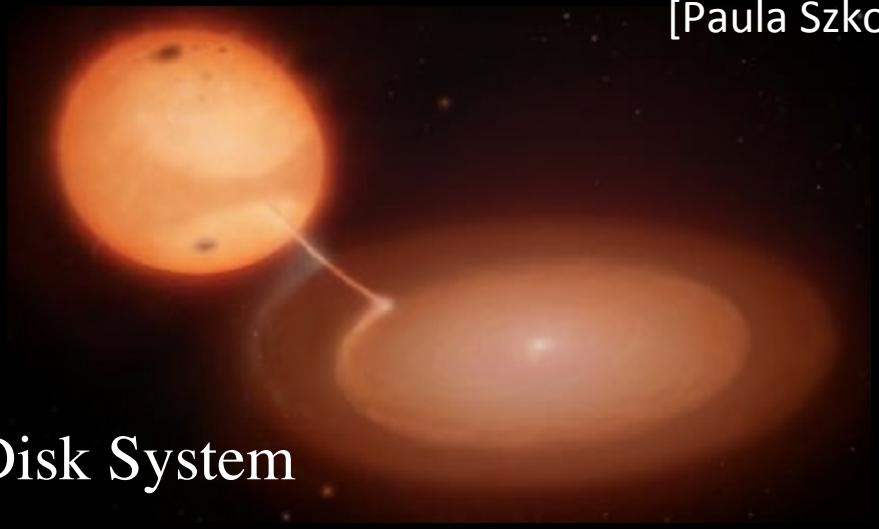
What's next?

- New models of TŻO interiors (dynamics, chemistry, etc.)
- New predictions of observables
- Search for pre- and post-TŻO signatures (supernova remnants, binaries, “naked” TŻO cores...)

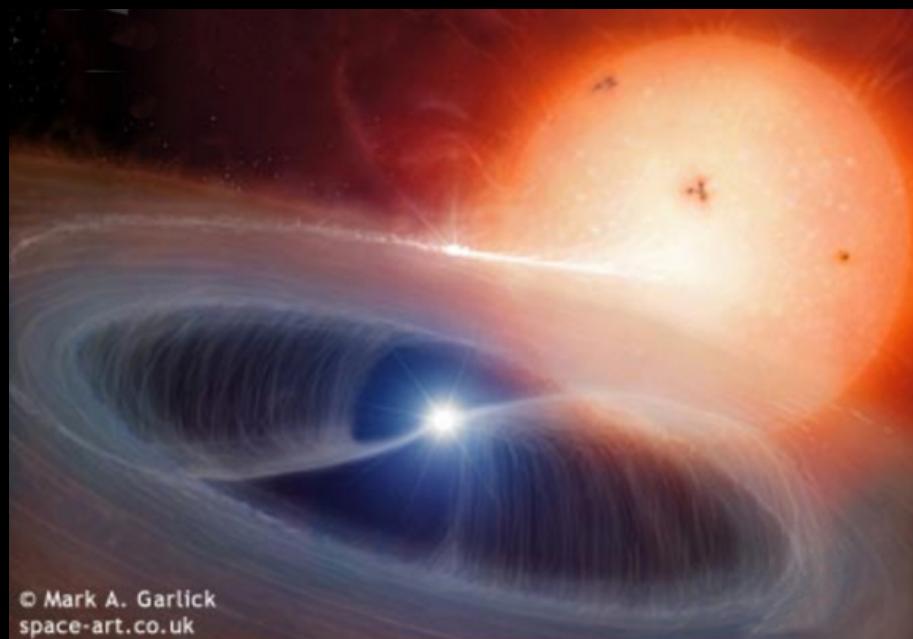
emsque@uw.edu

Cataclysmic Variables

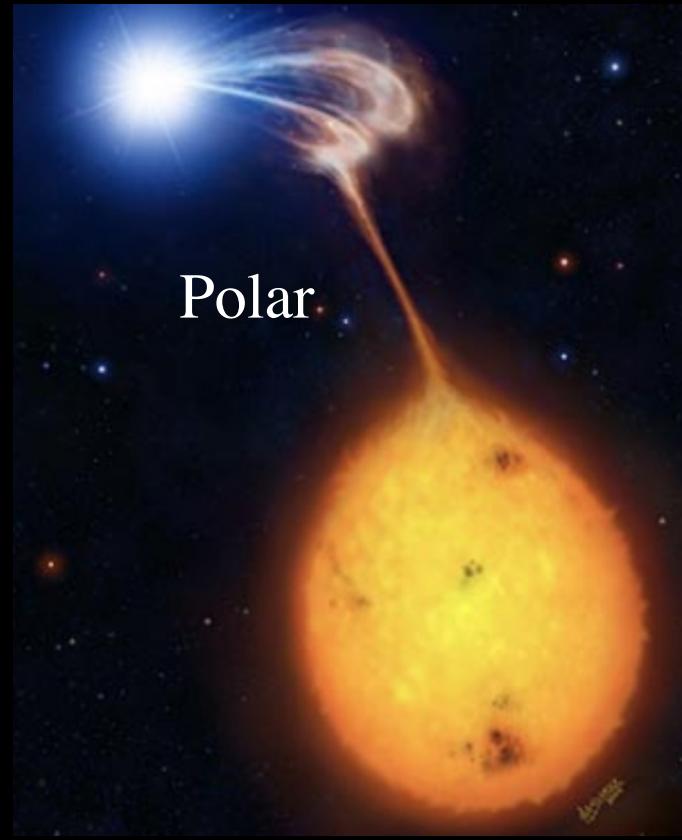
[Paula Szkody]



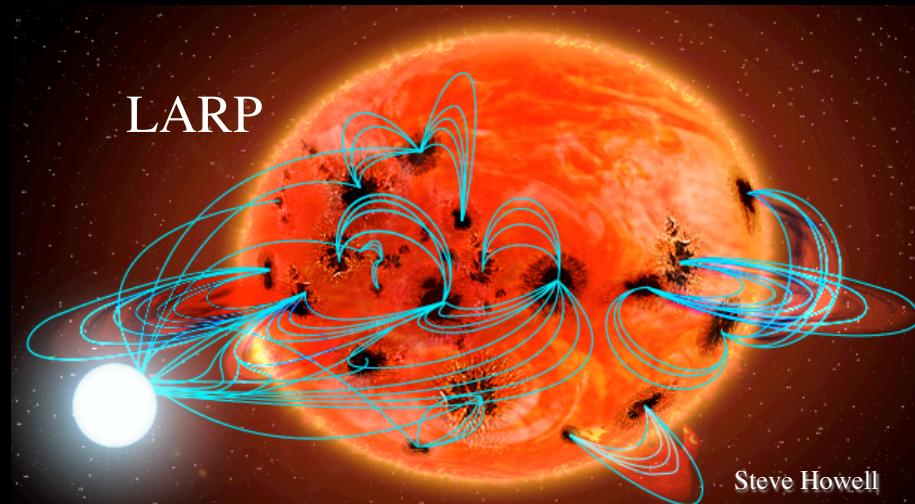
Disk System



Intermediate Polar



Polar



LARP

Steve Howell

Key Questions:

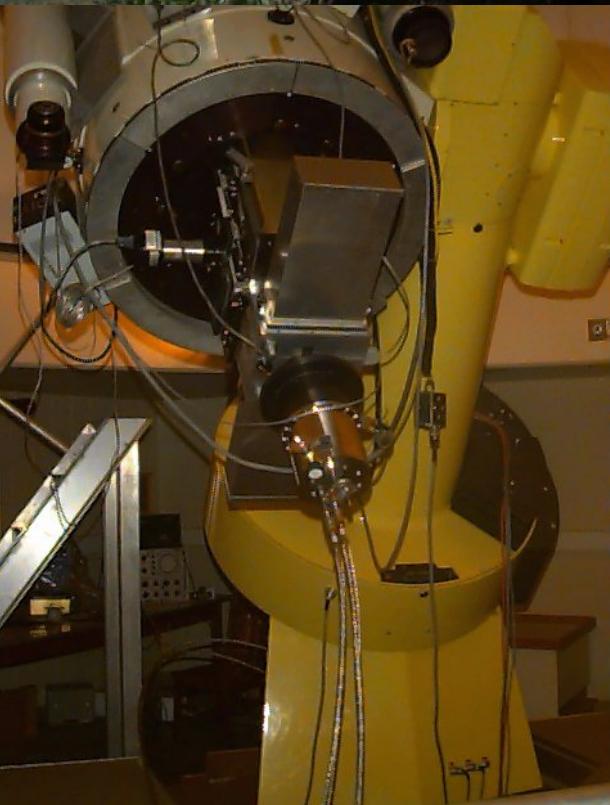
- How many are there?
- How do they evolve?
- What are the effects of mass transfer, accretion?

Optical Gives Info on:

- numbers from surveys
- types of systems
- timescale of phenomena



U of W 30 inch reflector at Manastash Ridge Observatory outside Ellensburg Lat=+47



SDSS1700

V-C

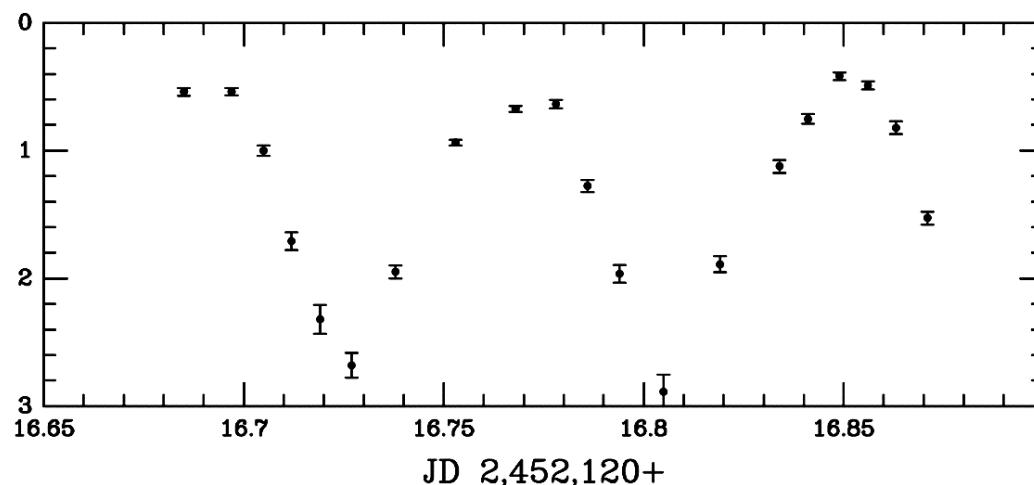
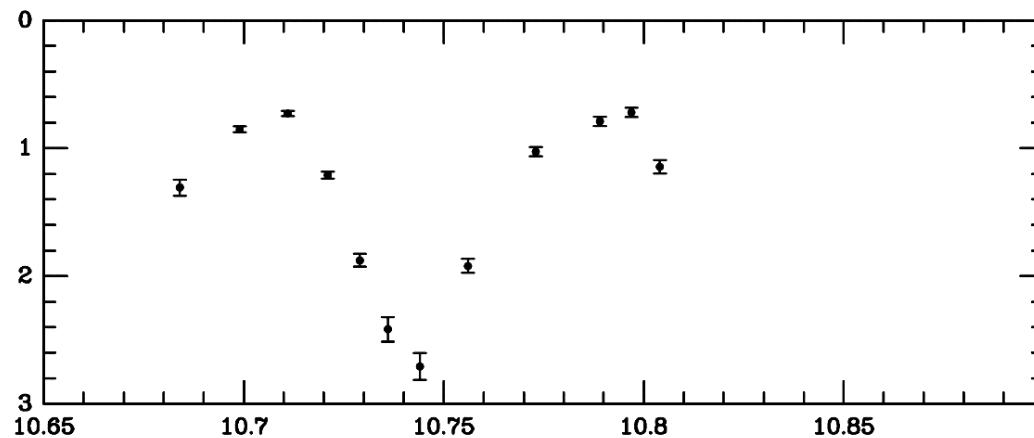
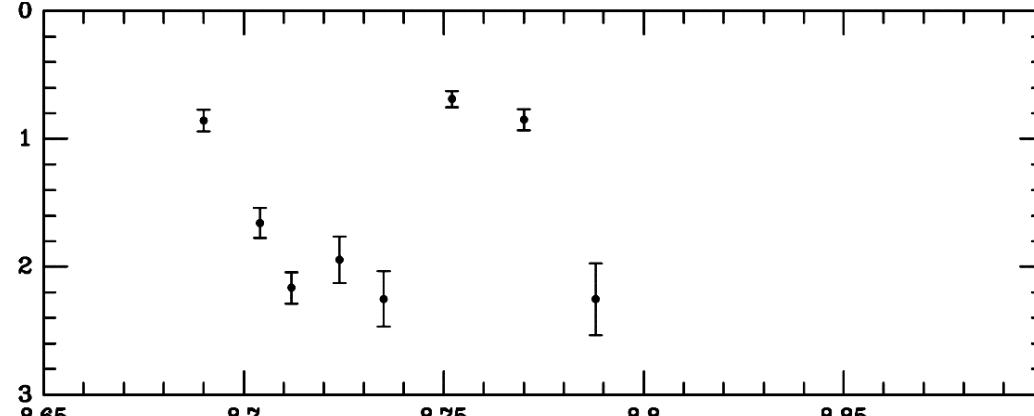
MRO photometry

Found Orbital Period

P=115 min

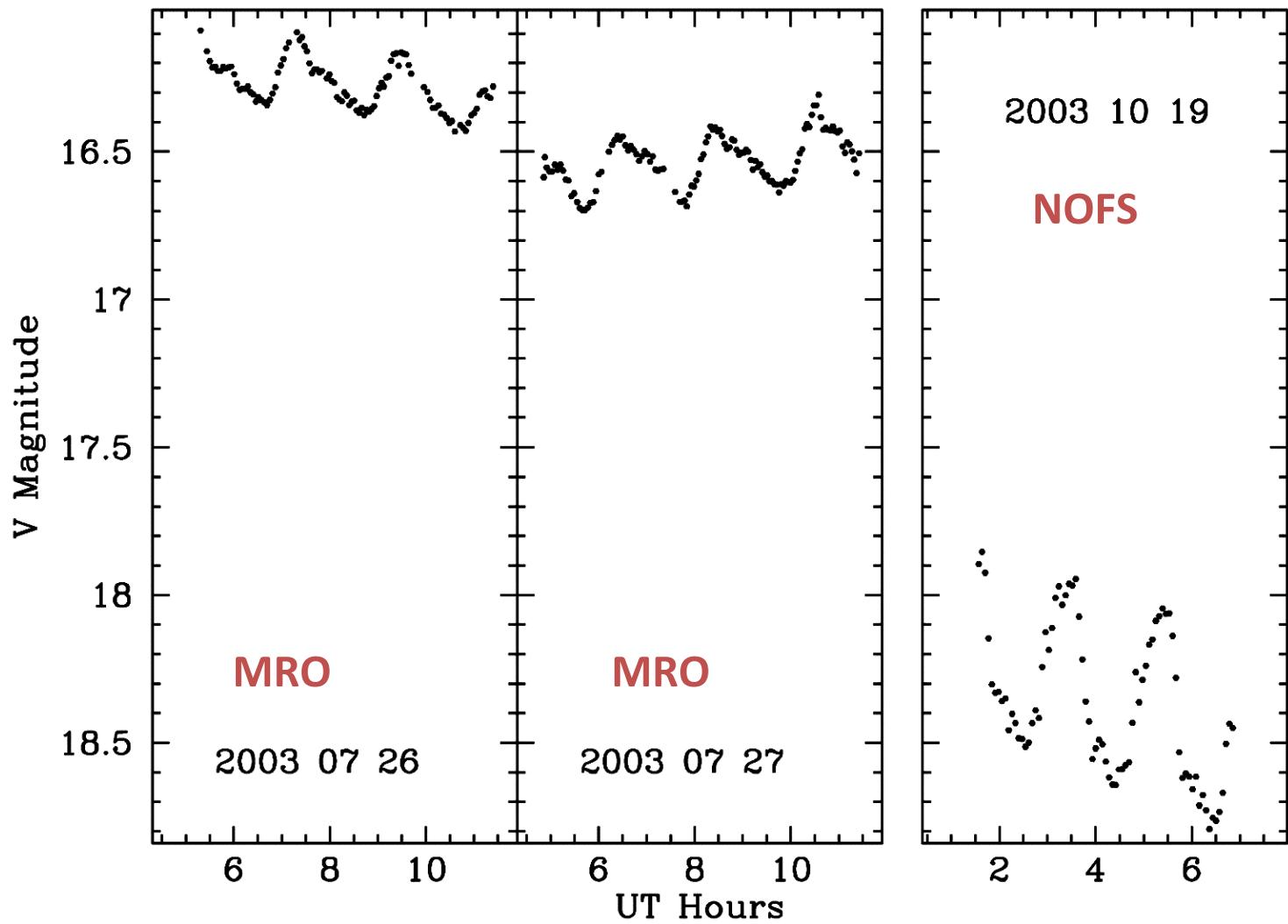
V-C

V-C



Positive SH

P= 1.9 hr



**Apache Point
Observatory New
Mexico**

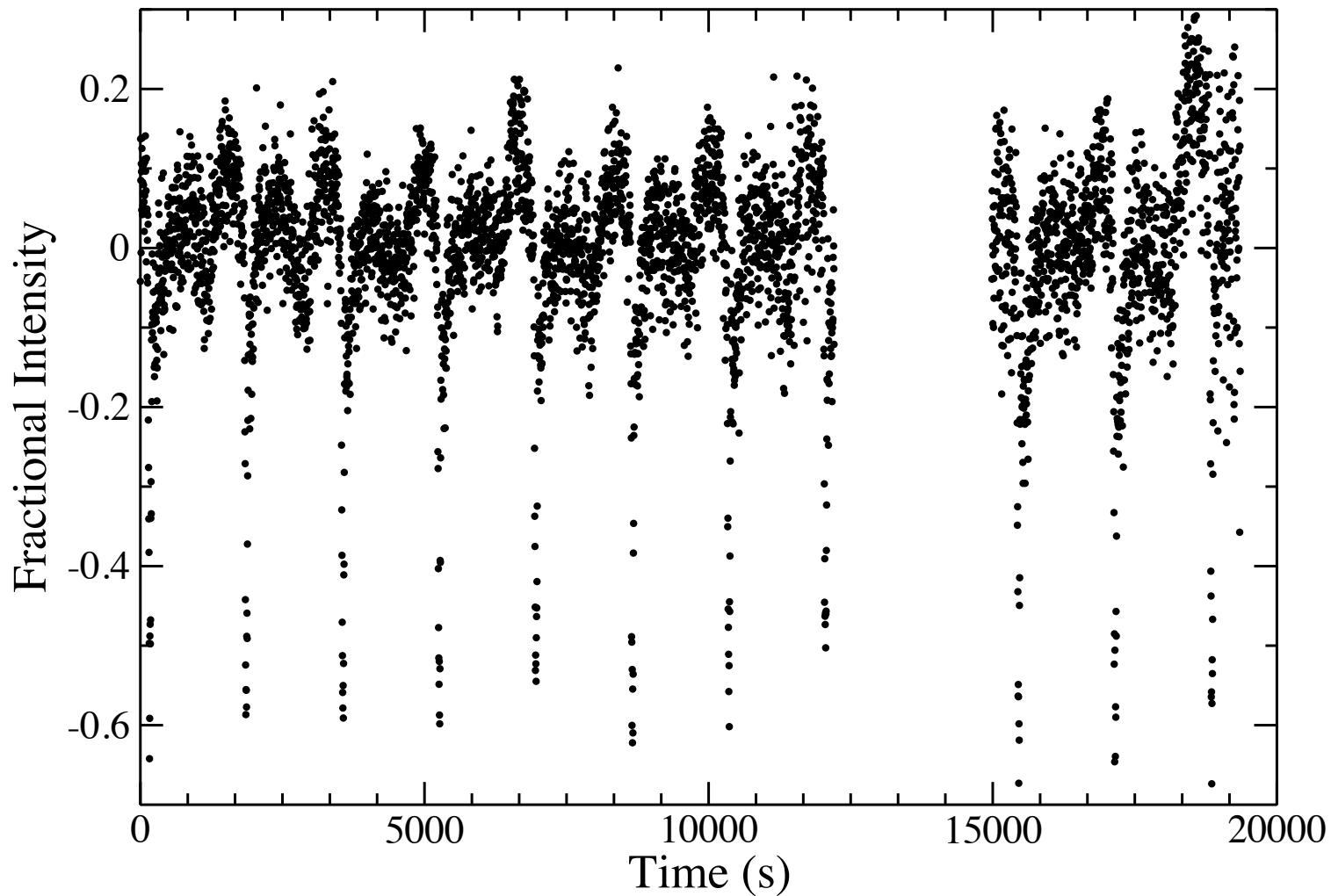
Lat =+33



Eclipsing AM CVn P=28 min, eclipse=1 min

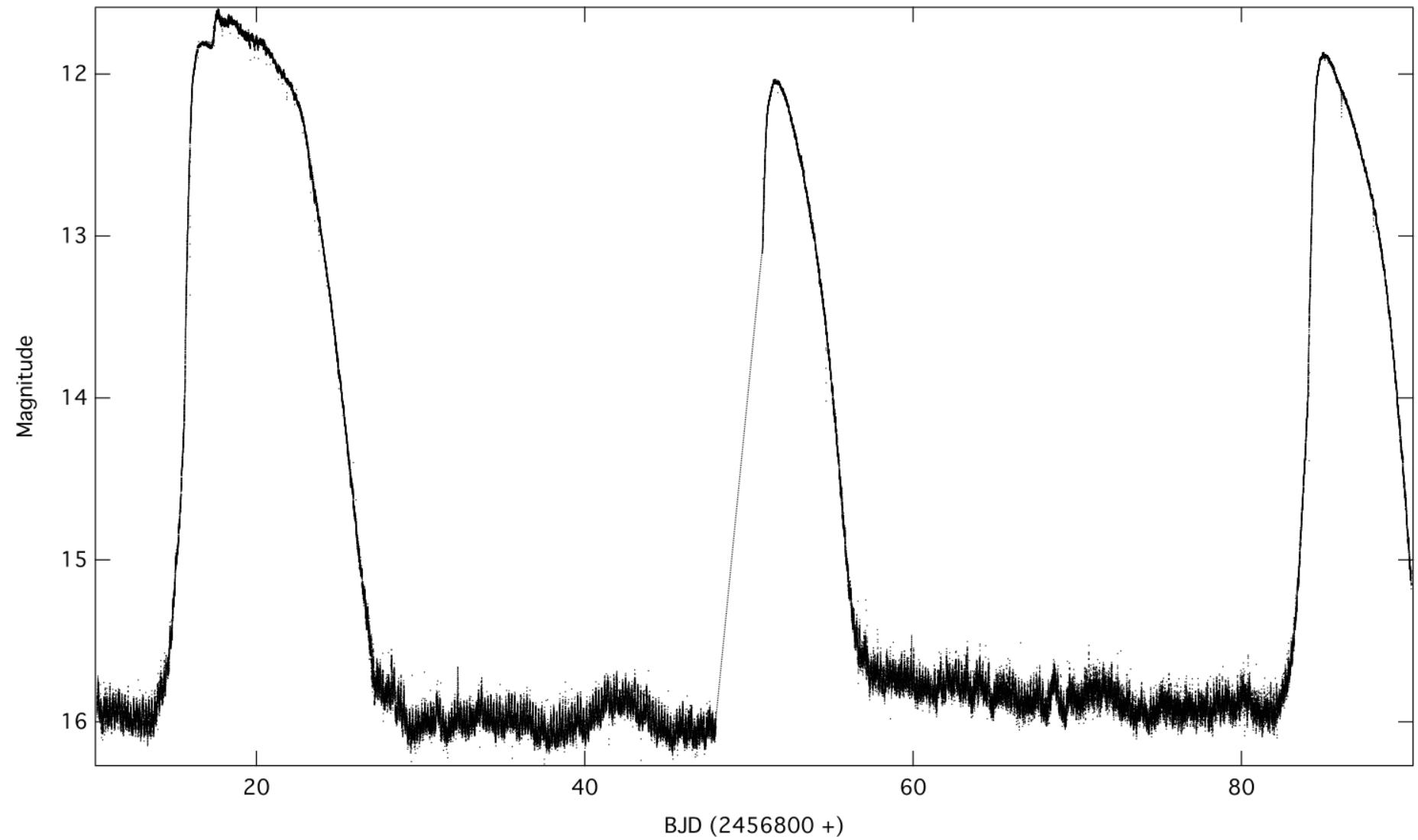
SDSS0926+3624 (8 December 2013)

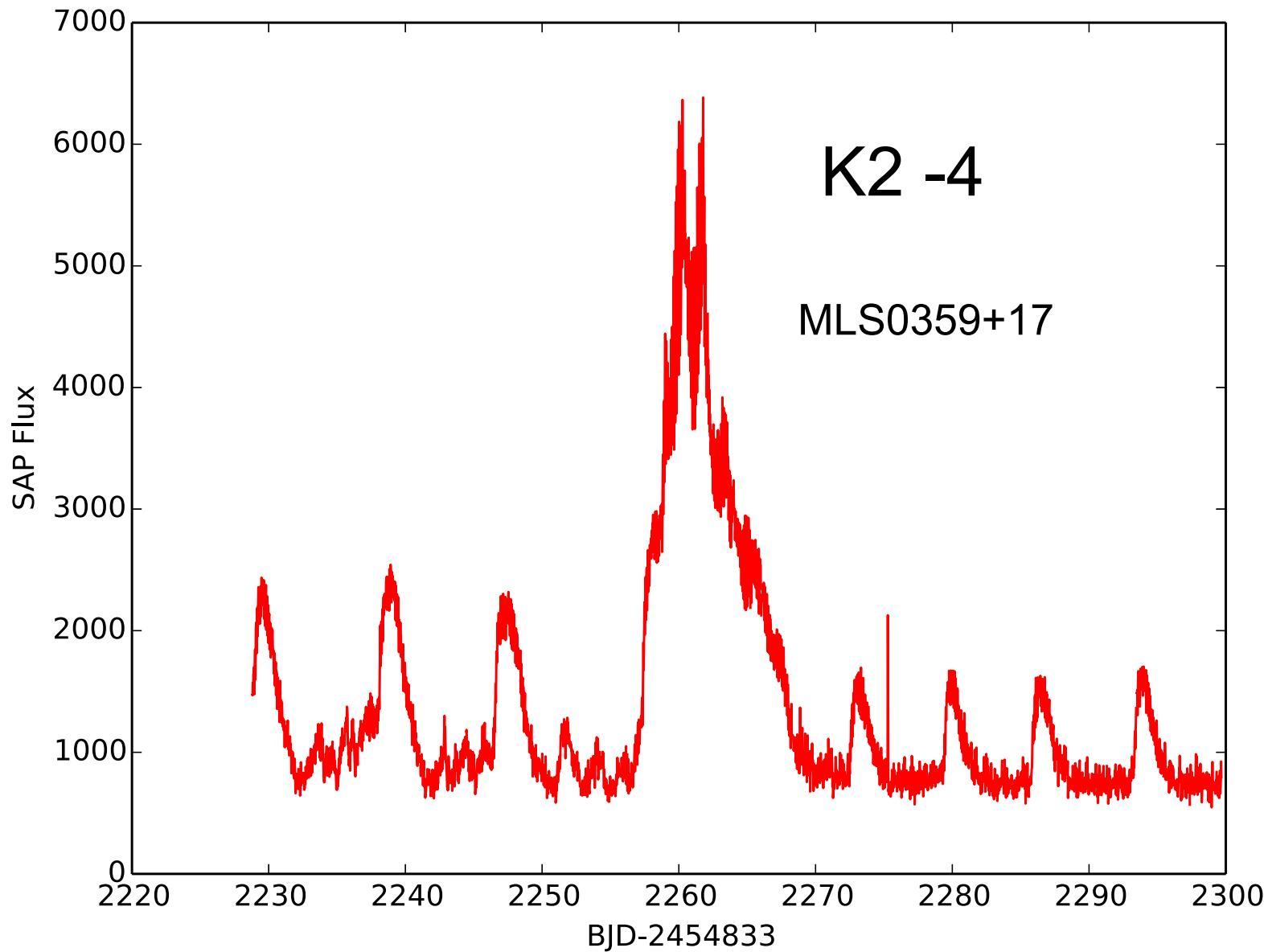
AG0168a-AG0170a, APO, 3.5m, Agile, 4s exptime, BG40 filter



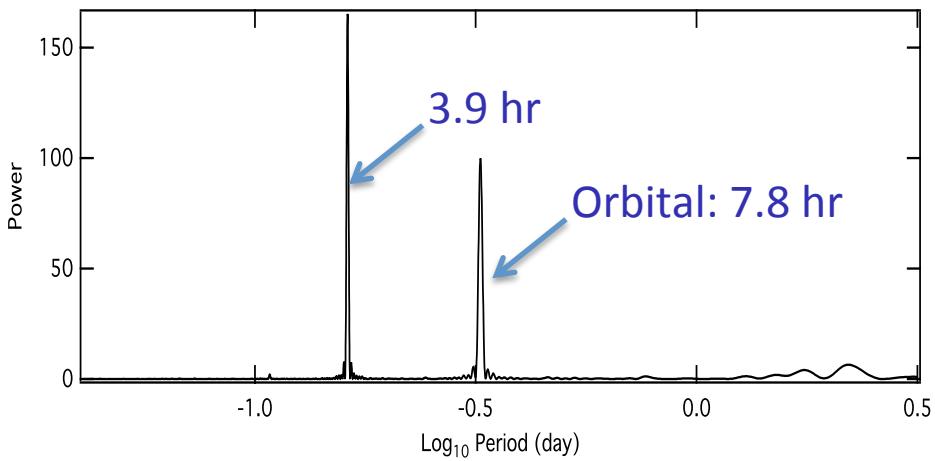
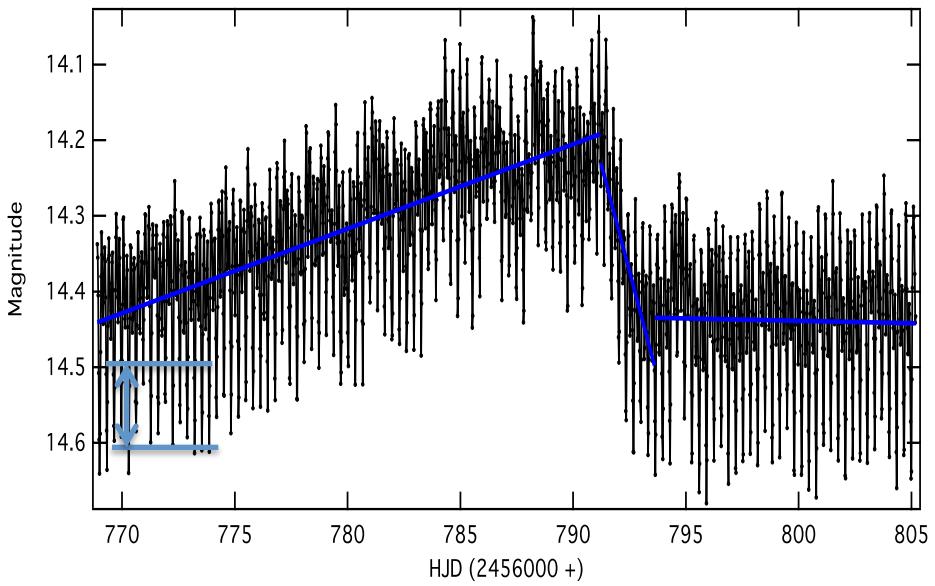
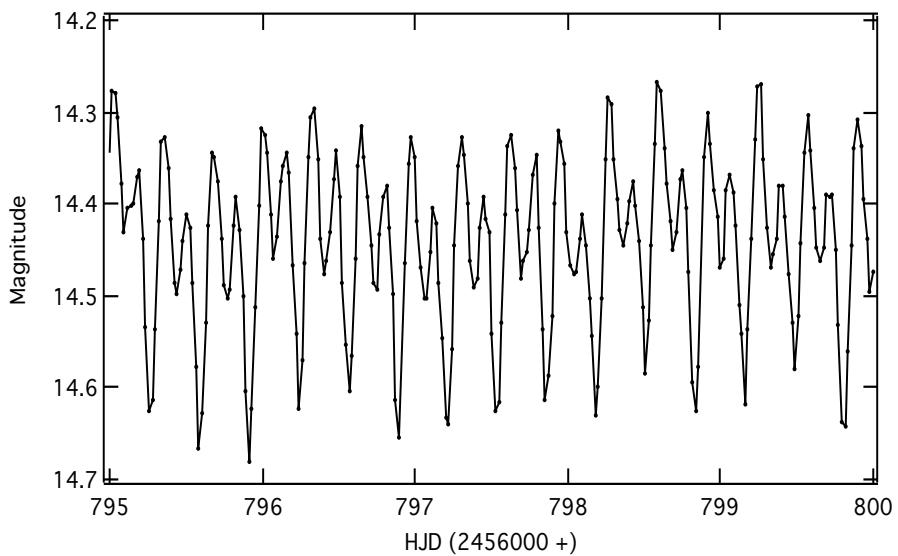
Kepler Satellite Data

K2-1 TW Vir





SDSS J0632+25



The Far Future: LSST (2022-2032)

