

AIP

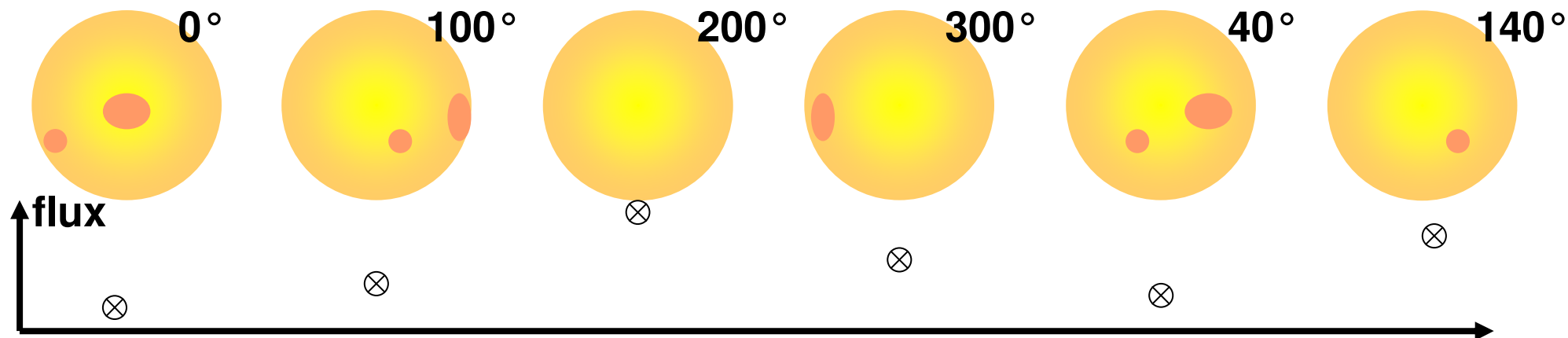
# The rotational evolution of low mass stars

by

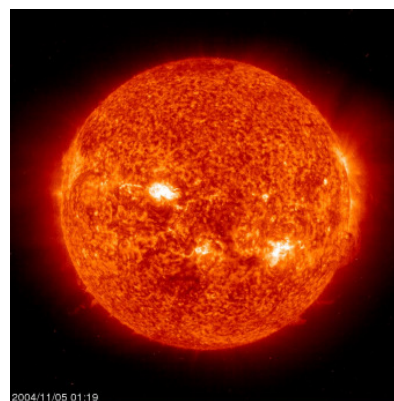
Daniel Fügner

Klaus G. Strassmeier, Thomas Granzer,  
Jan Neumann

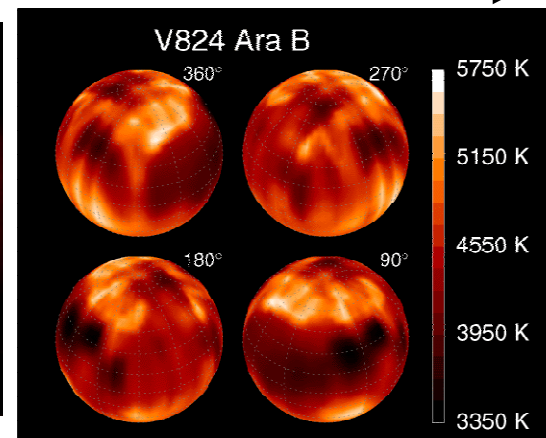
# Measurement of stellar rotation - Photometry



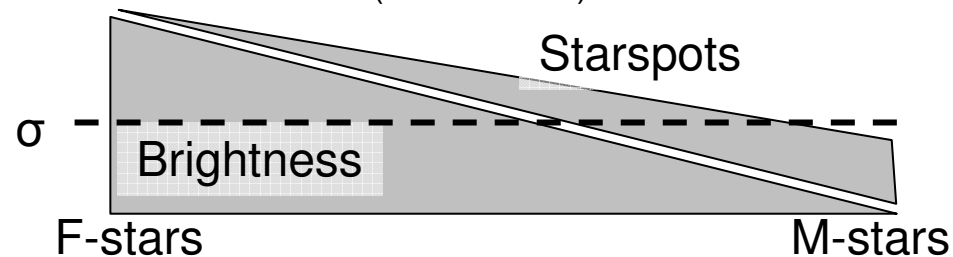
- spot-related photometric modulation of starlight
- amplitude  $\geq \sigma_{\text{Noise}}$
- late type stars: better contrast vs. lower flux



Sun at solar maximum  
(source: Soho, EUV)



Doppler Imaging of a K0V star  
(source: AIP)

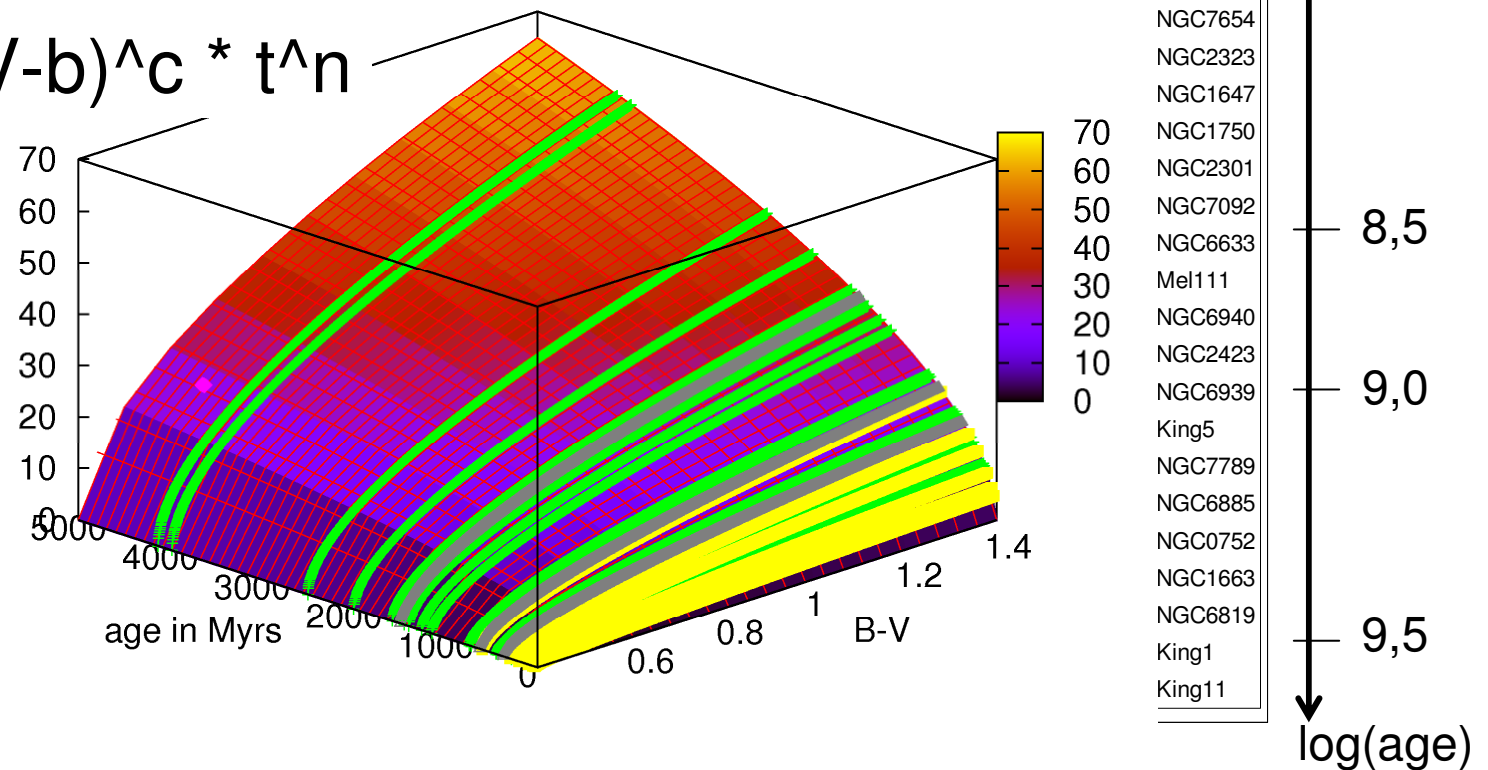


# Plans for observations

- observing open clusters
  - each more than 120 days
  - at most three at the same time
- using Stromgren & H $\beta$  for stellar properties
- using Sloan r' for timeseries

$$P(B-V,t) = a(B-V-b)^c * t^n$$

(data: Barnes,  
2003 & 2009)



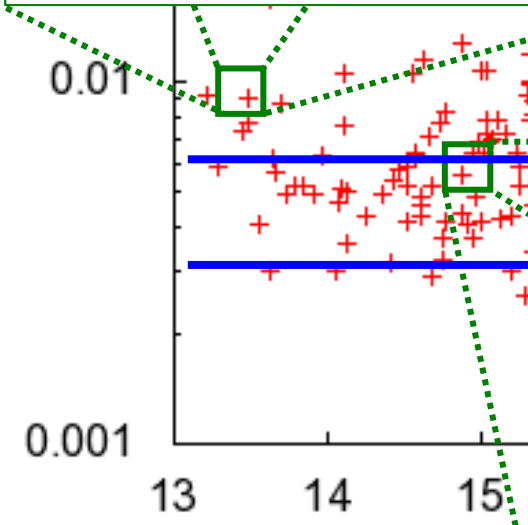
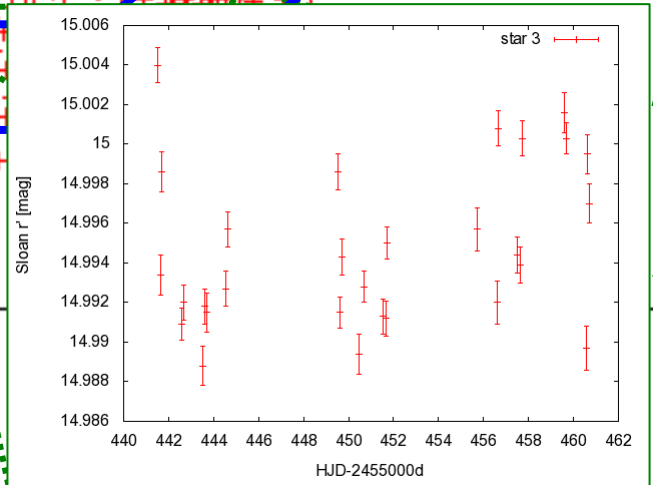
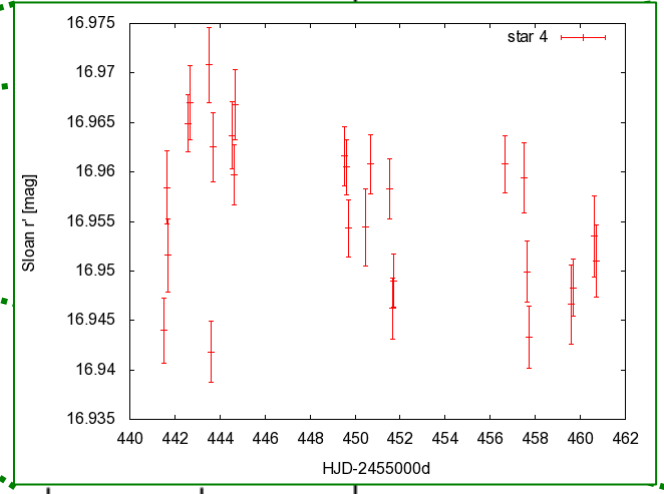
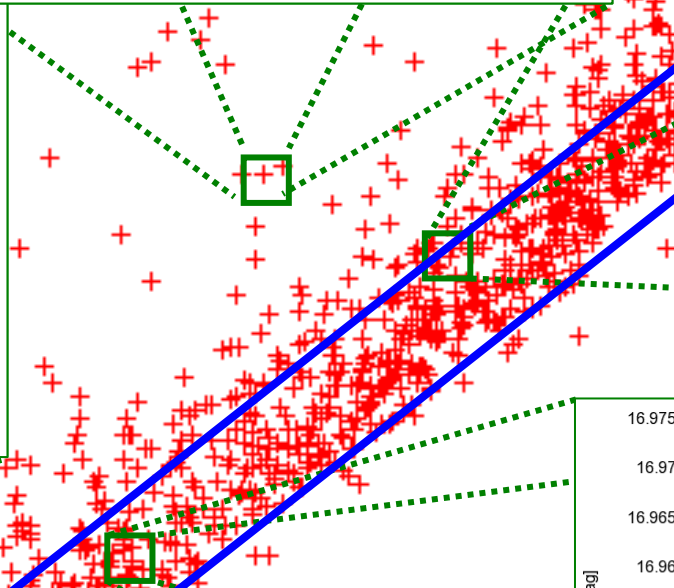
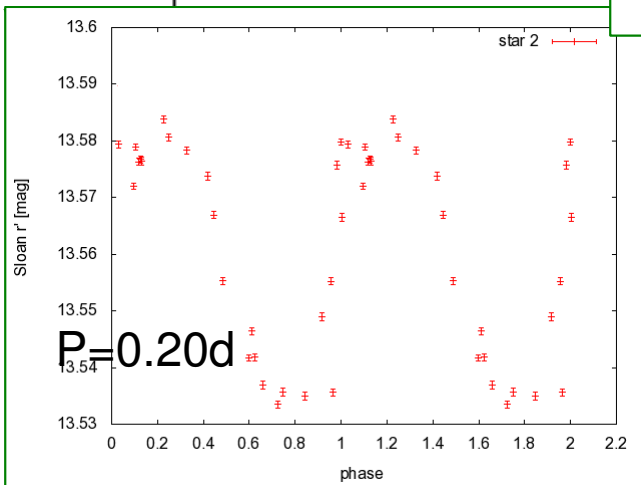
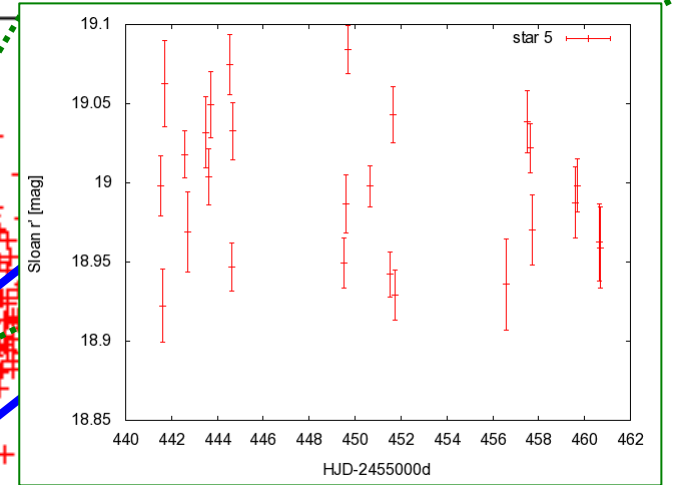
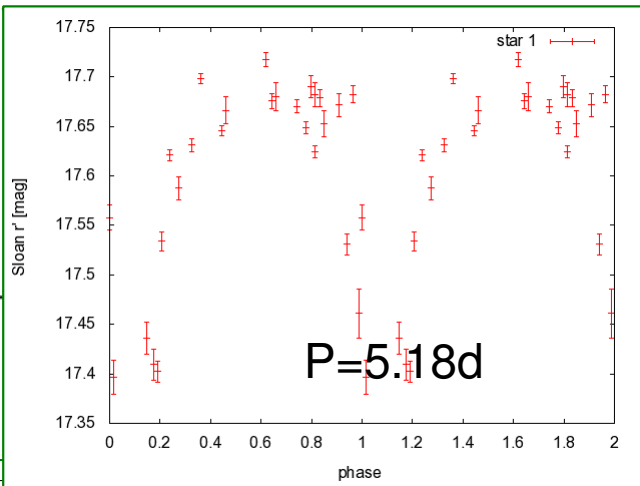
# What we expect from rotational measurements

- ❖  $P(t, M/\text{color}, [\text{Fe}/\text{H}]) \rightarrow$  evolution of stellar rotation
  - better stellar models (evolution)
    - circumstellar discs in the beginning
    - property of rotation in the star (solid vs. differential)
  - better understanding of magnetic fields and magnetic field effects
    - dipolar vs. radial, evolution?
    - properties of stellar wind
    - star spots (size, lifetime)
  - new method of age determination, called “Gyroage”

# NGC 0752

stdev

1



0.01

0.001

20

21

22

# Outlook

- Scheduling phase

- first good data available
- first variations found

- Next steps

- use all available data to make timeseries
- remove all systematic errors, which increase noise
- observations in Stromgren during next new moon

➤ NGC 1647