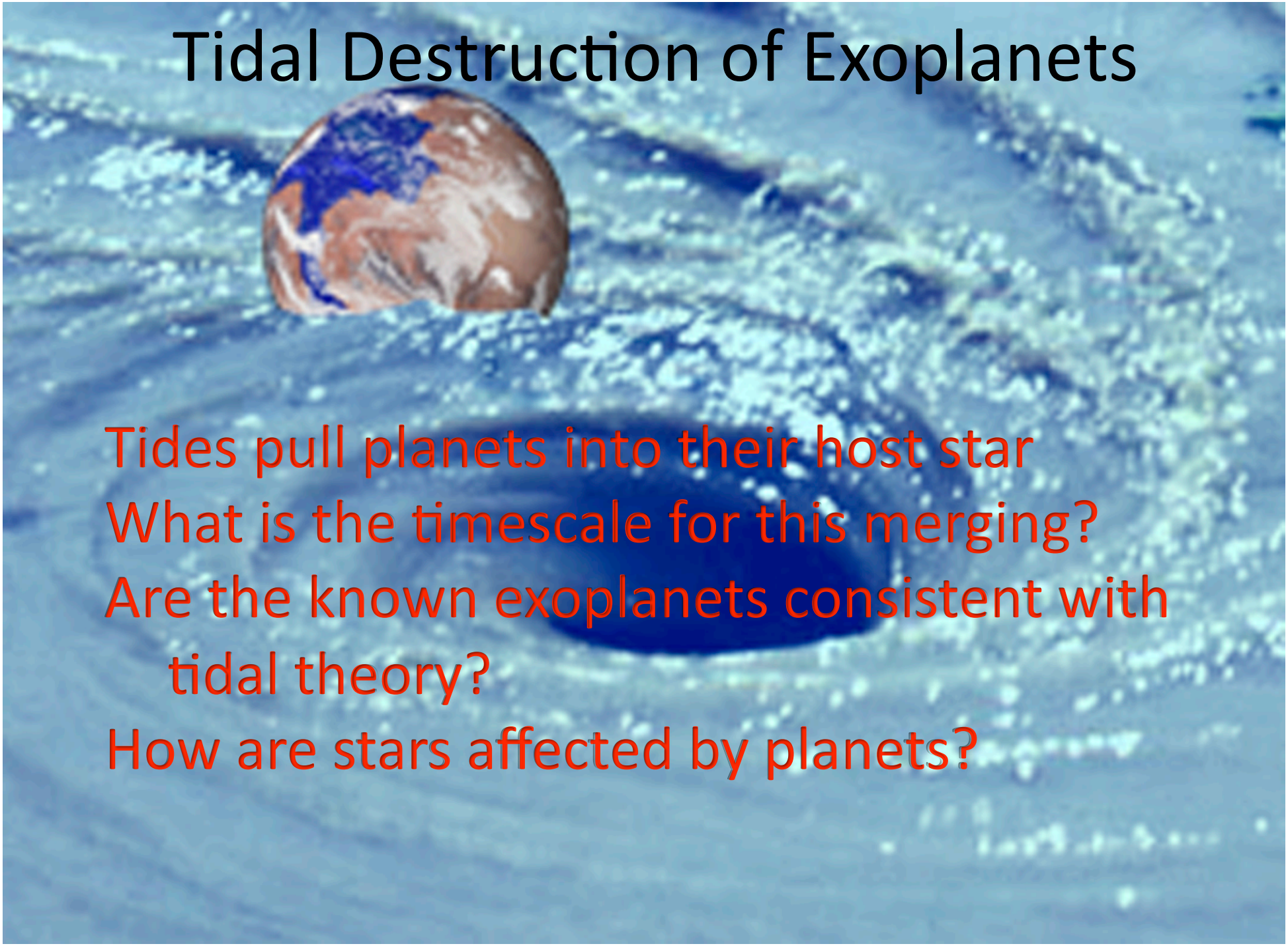
Tidal Destruction of Exoplanets

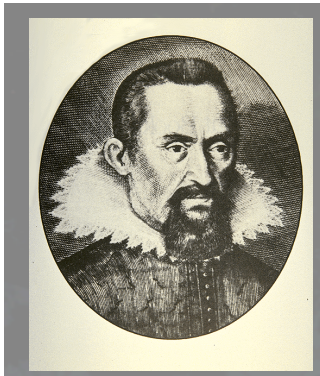


Tides pull planets into their host star

What is the timescale for this merging?

Are the known exoplanets consistent with tidal theory?

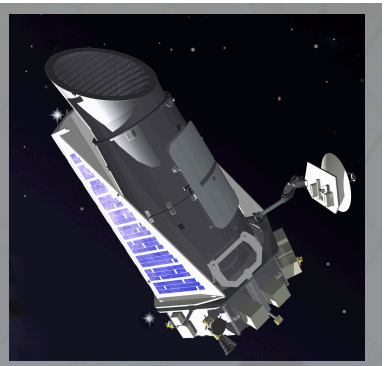
How are stars affected by planets?



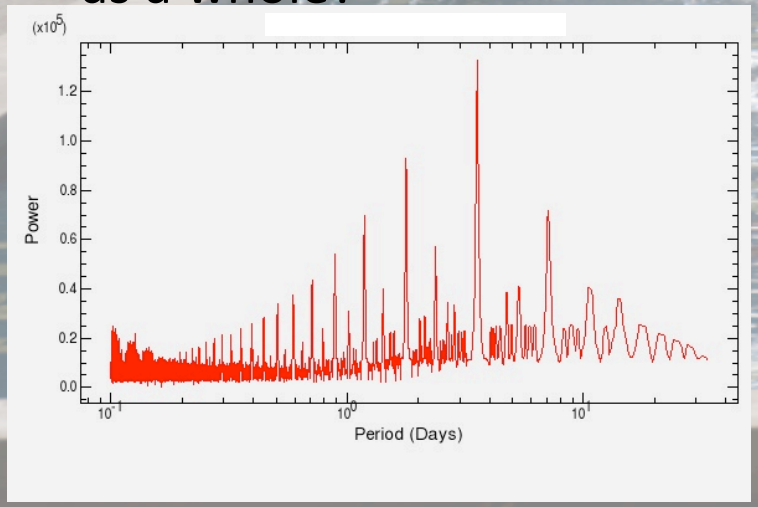
NanoKepler

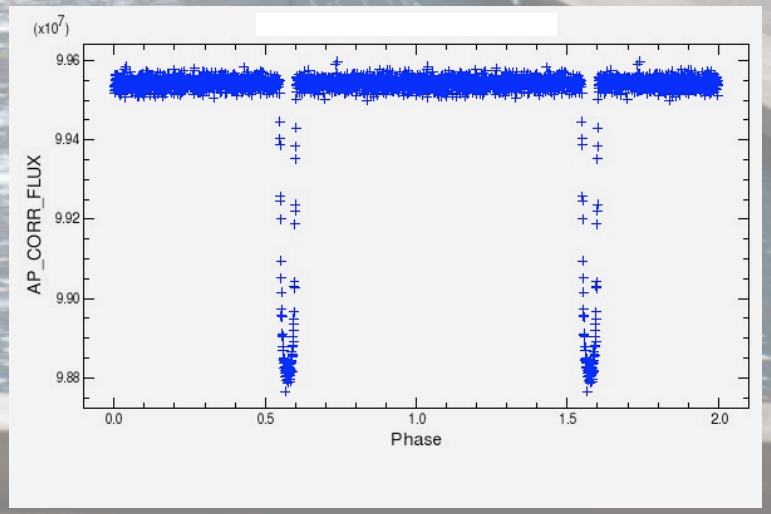
Basic scenario:

very small Kepler Mission analog.



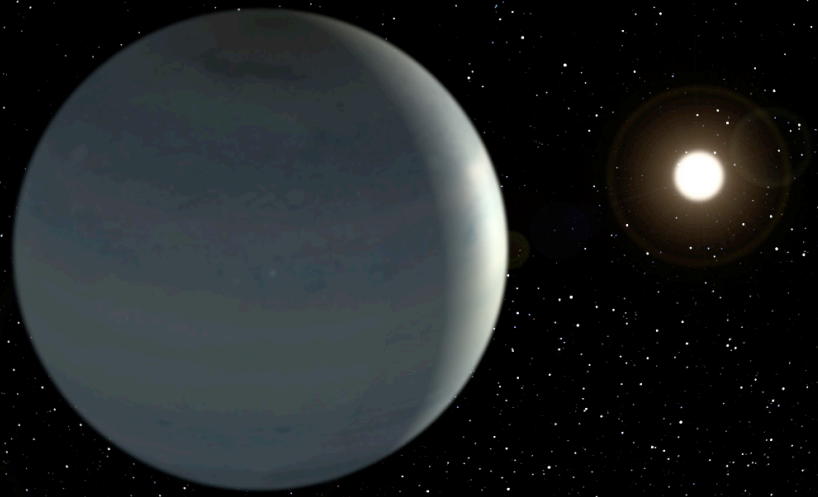
- You have photometric light curves of 50—100 Kepler targets.
- Find and characterize the transiting exoplanets within them.
- Are there any “false-positives”? What are they or could they be?
- What other kind of variable sources can you find and identify?
- What can you say about the variability characteristics of the dataset as a whole?





HUNTING FOR PLANETS WITH COROT

- Extracting and using data from the Convection, Rotation, and Transit (CoRoT) satellite.
- Becoming familiar with the CoRoT data products and the noise properties.
- Investigate the light curves using various techniques, identifying periodic signatures and determining their nature.
- In particular, locate the signatures of transiting exoplanets and characterize them.



Artist's depiction of CoRoT-9b

NExScI

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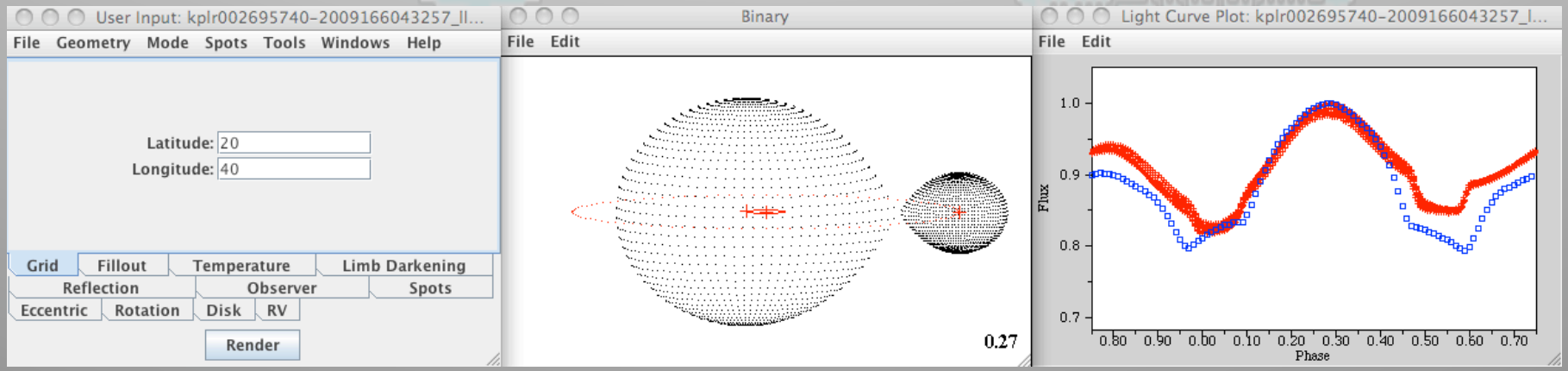
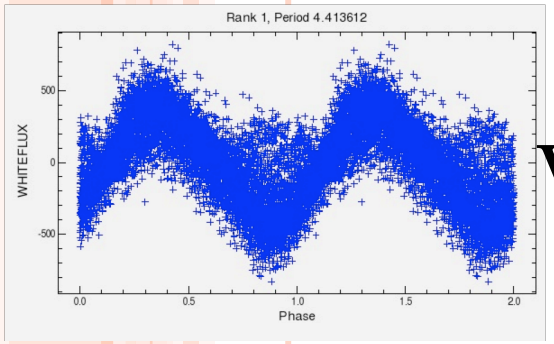
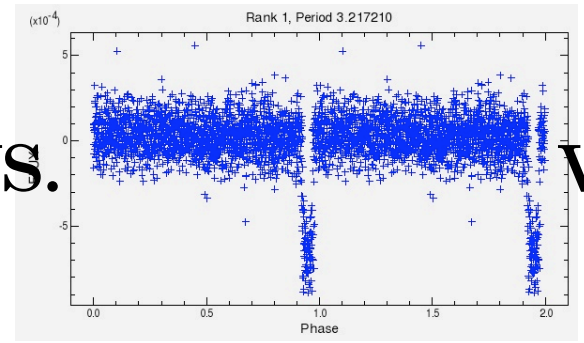
Group Project: Measuring Eclipsing Binary Star Parameters from Kepler Data

- Use NStED catalogue and periodogram service with new Kepler data
- Use 'Binary Maker' to visualise and investigate binary systems
- Learn:
  - Different binary light curve types
  - How different system properties relate to LCs
  - What can be measured and how well





VS.



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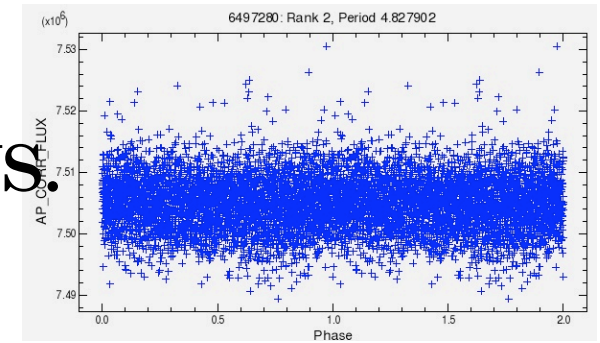


Group Project: Identifying and classifying variable sources in the Kepler data

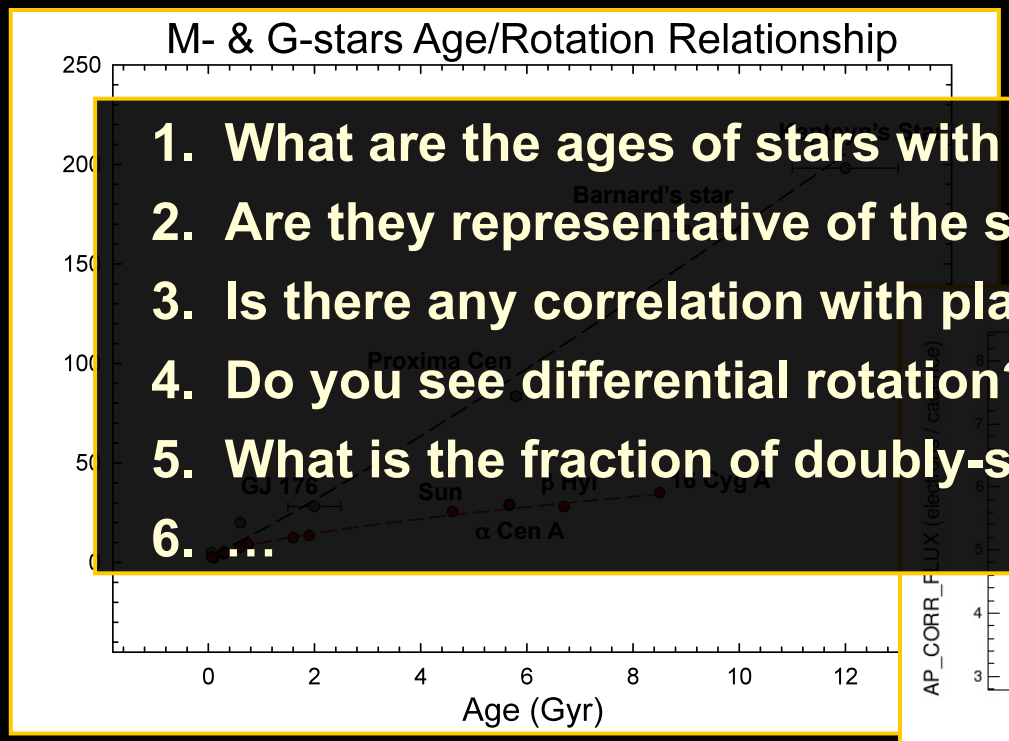
- Every star has a story: a light curve.
- How do you listen to 150,000 stories at the same time, and
- How can you (easily and accurately) tell which stories are interesting?

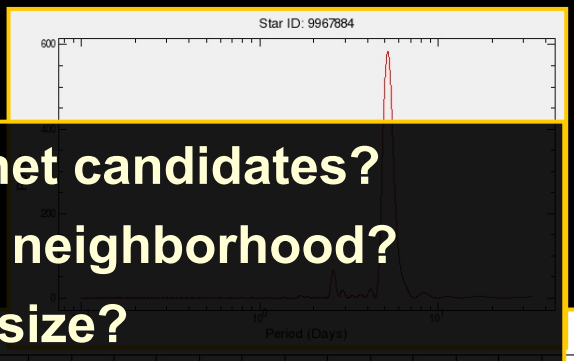
Learn about variability statistics, periodograms, machine learning classification schemes, the utility of ancillary information.

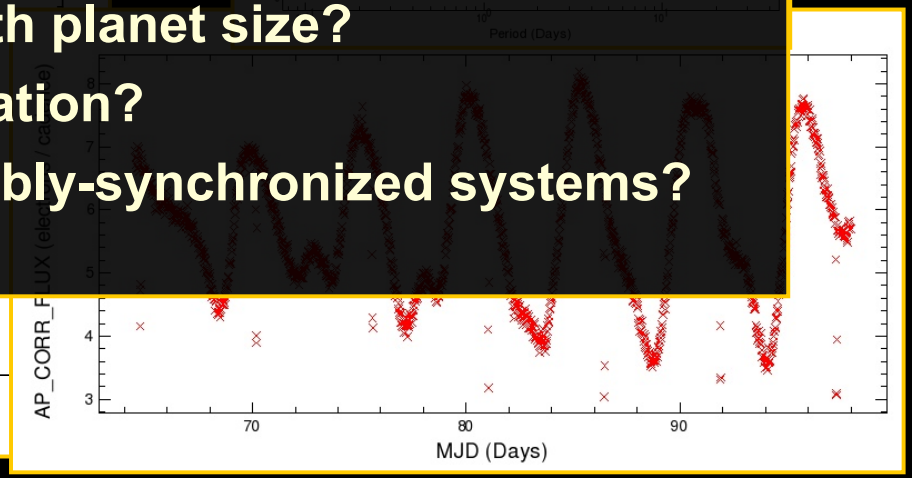
Group project: Characterizing Stellar Variability with Kepler and CoRoT

Ed Guinan & Ignasi Ribas

Use Prot-age relationships and period-search tools to determine the ages of Kepler planet candidates







1. What are the ages of stars with planet candidates?
2. Are they representative of the solar neighborhood?
3. Is there any correlation with planet size?
4. Do you see differential rotation?
5. What is the fraction of doubly-synchronized systems?
6. …