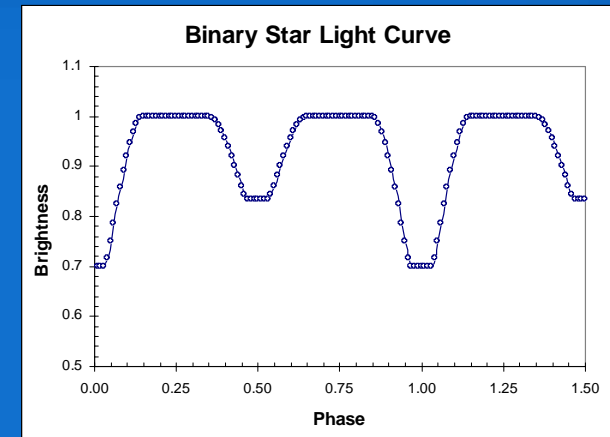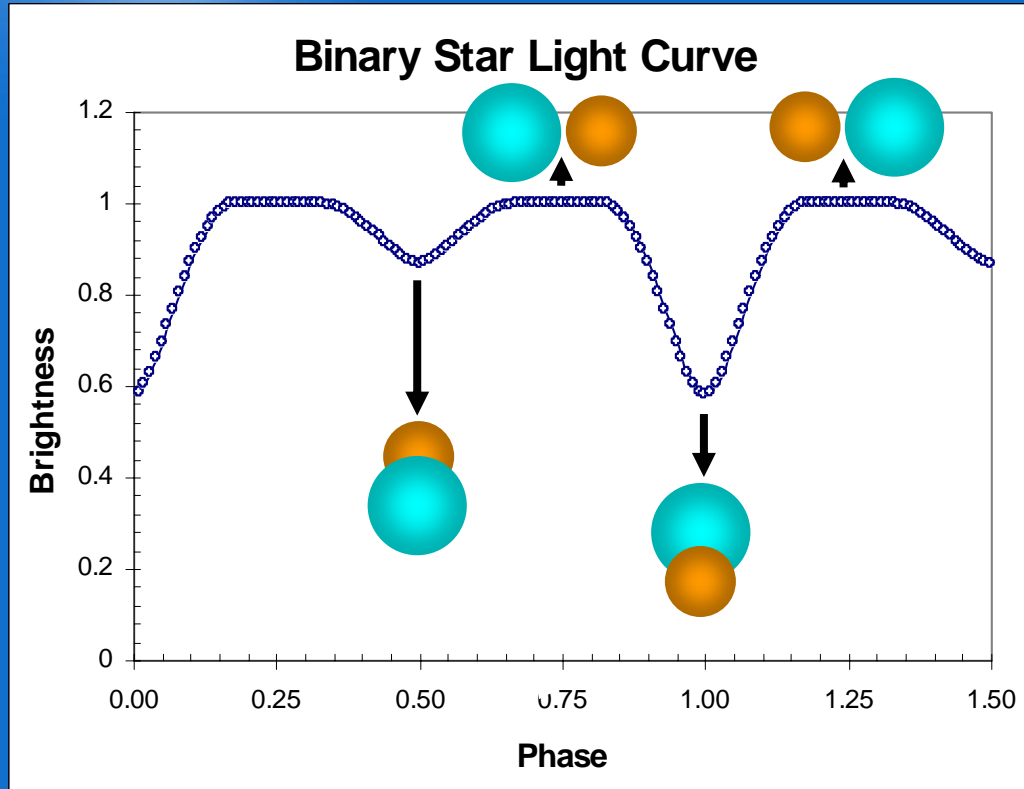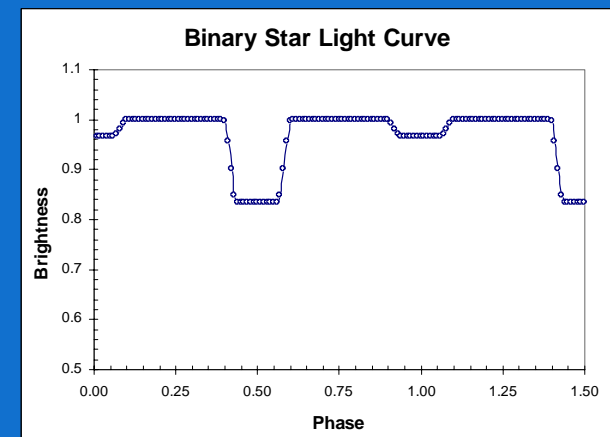# Discriminating planetary transits from eclipsing binaries in the CoRoT light-curves

The signal of eclipsing binaries
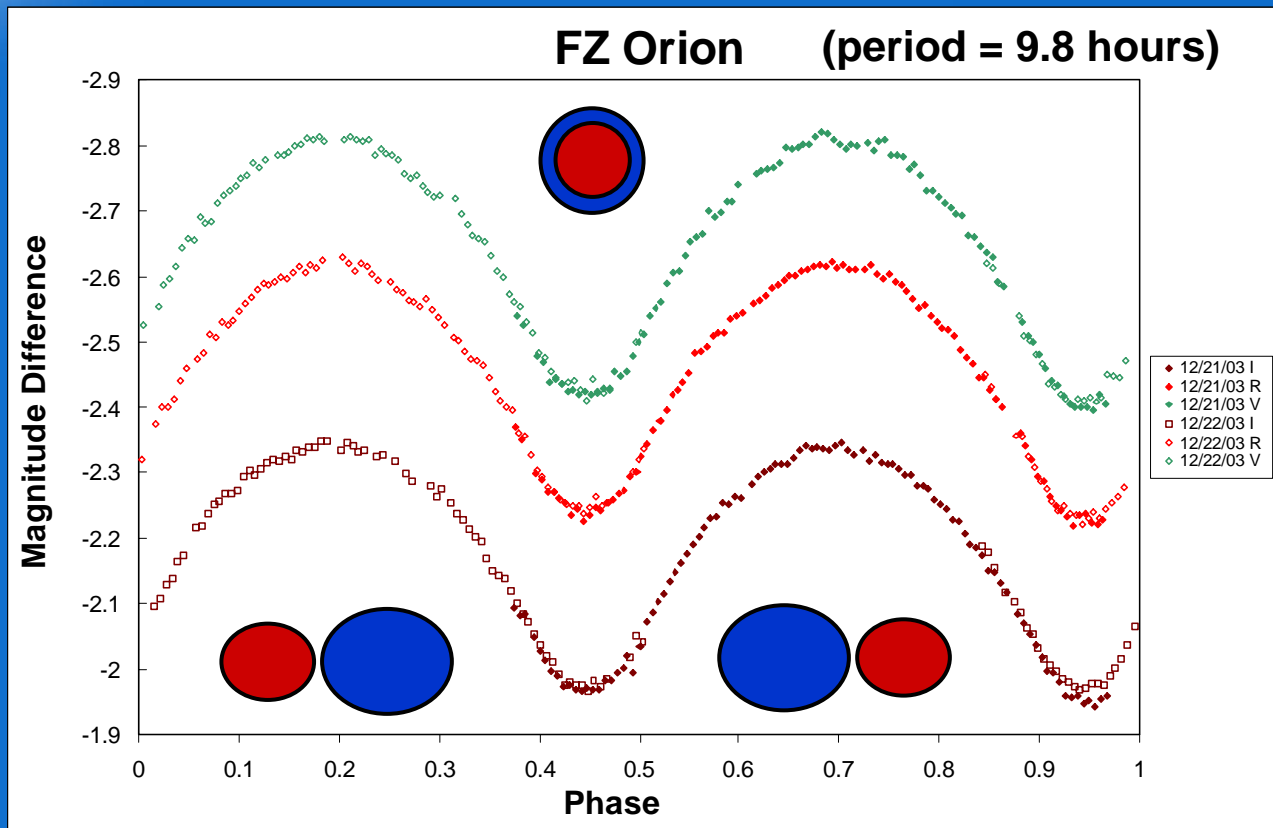

For a smaller inclination

For smaller radii

→ The depth and color of successive transits are different except for identical stars

→ V shape due to grazing occultation is common

FZ Orion **(period = 9.8 hours)**

Out of the eclipse the upper part of the signal (LC) is also modified
due to the Increased surface of the star disks under tidal effect

→ Periods are very short

Discriminating procedures

- Detection of secondary transits
  - ⇨ Folding of the LCs at ½ the period
- Criterion on the transit shape
  - ⇨ Oversampled data will help for transit reconstuction
- Criterion on the color of the transits
  - ⇨ Possible as far as the color channels are not too noisy
  - ⇨ If the two stars have significantly different temperatures
- Use of the spatial separation of the colored channels
- Use of the information on the background stars
  (from the ExoDat database)

Spatial separation in the PSF

Target star + neighbors

P. mask

"Green"

"Blue"   "Red"

Flux from target   Flux from neighbors
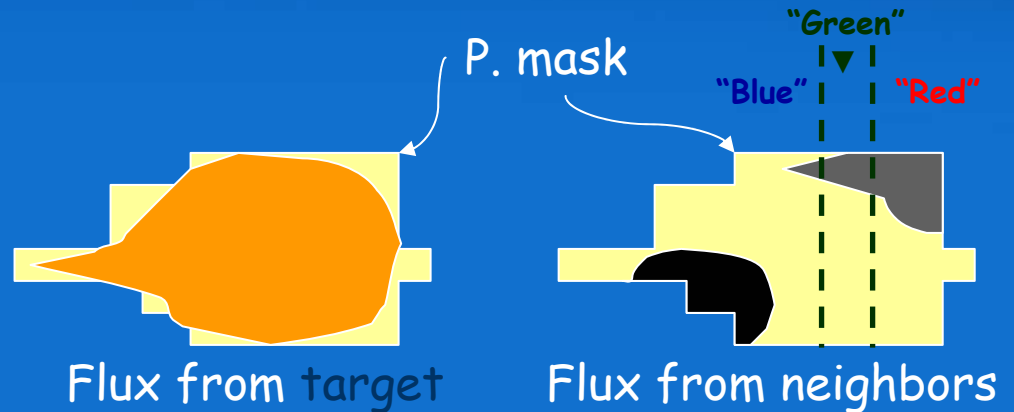
"Red" :   channel polluted by the grey neighbor
"Green": polluted by the "tail" of the grey neighbor
"Blue" :   channel polluted by the black neighbor

→ Transit-like signals in a single channel may be discriminated from transits on the target star

Identifying possible guilty EBs

Use:
- The spatial separation of the color information
- The a priori knowledge on the background stars (position, magnitude, colors, in Exodat)
- The software for the photometric masks computing S and N in each band with background

$(S/N)_B < (S/N)_G < (S/N)_R$

Transit candidate with its polluting stars
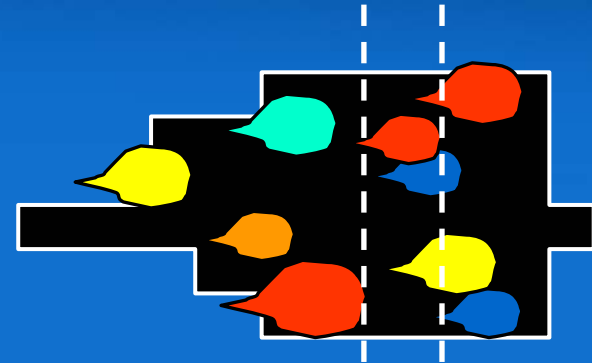
Simulate:
- choose one star in the polluting background stars
- decrease its flux to mimic an eclipsing binary
- compute signal and noise for the three colored channels of the target
- look if S_B, S_V, S_R are fitting or not to the detected event → Probability
- repeat for a large number of possible eclipses for the same background star

Output:
- probability that a polluting star gives a confusing situation (and the type of eclipse)

Repeat for each polluting star behind the target: → Probability the event be mimiced by an EB