Flip-flop or differential rotation?

Group B presentation

What we can do with photometry

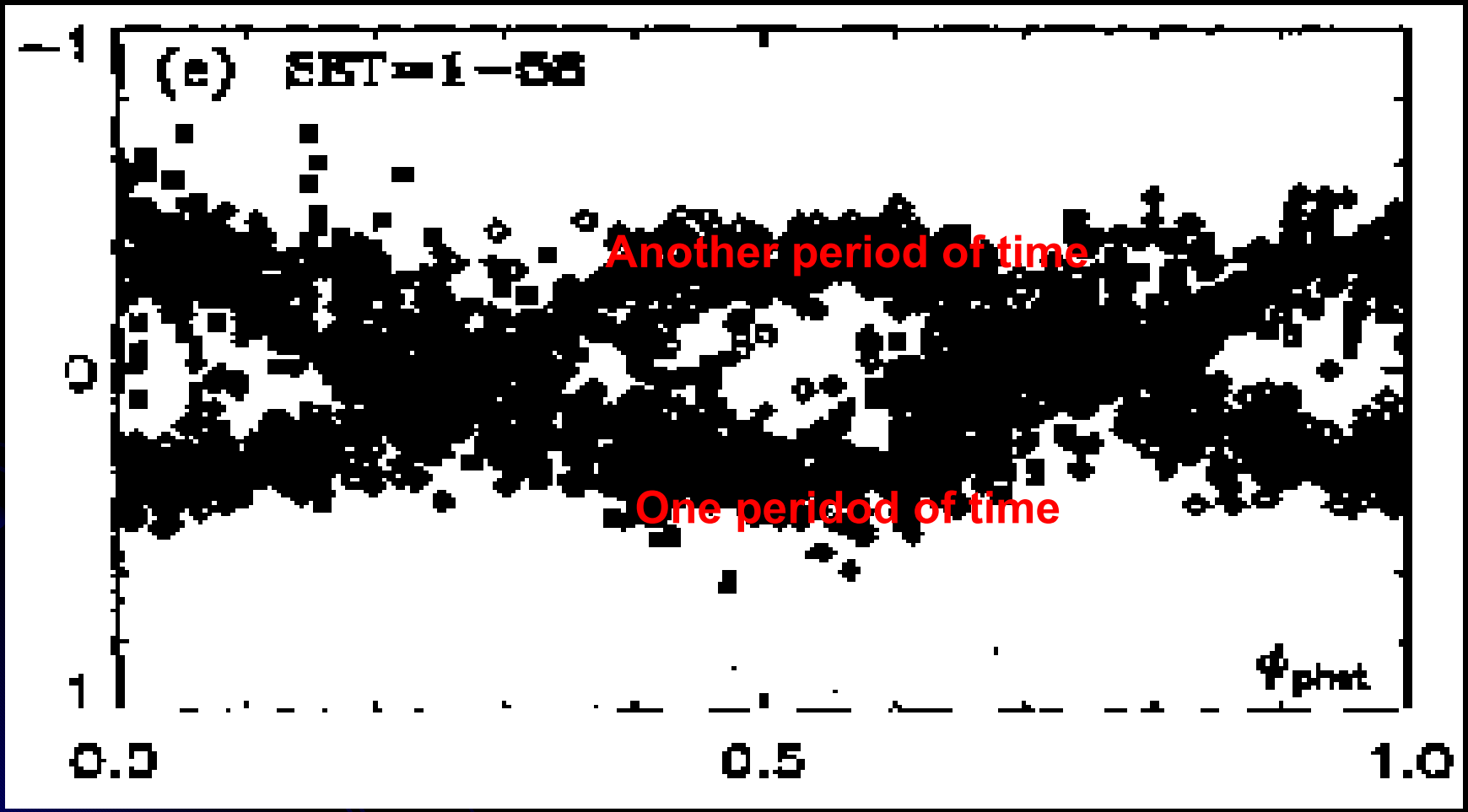
We can just measure the integral flux ~

We can not obtain any spectral information, etc.

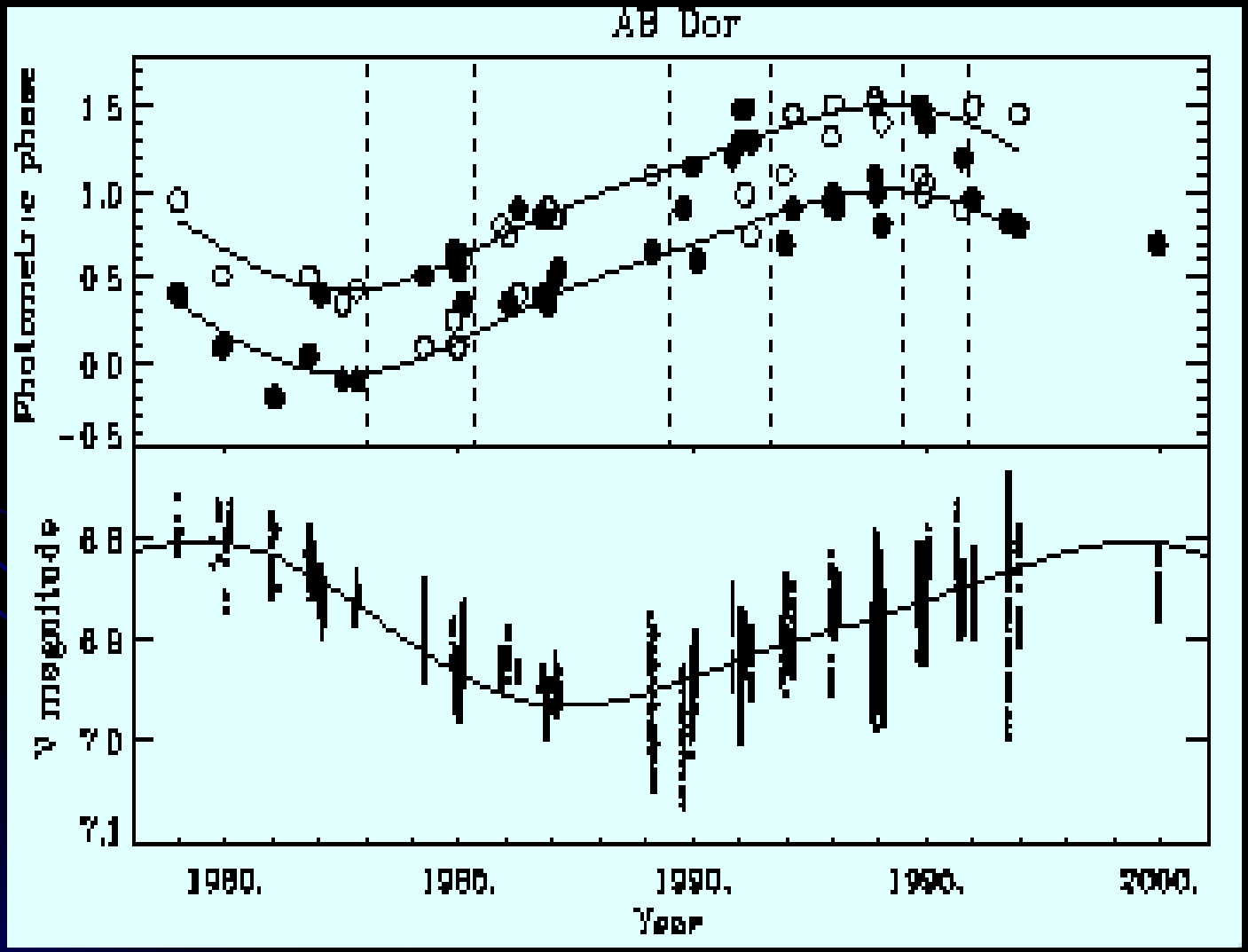
Our phenomena: Flip-Flop

- Flip-flop is a phenomenon when the star got two active longitudes
- They are always separated by 180 degrees in phase
- They may drift, but the difference of 180 degrees always remains
- The flip-flop itself is the shift of activity maximum from one active longitude to the antipodal one

Flip-Flop


(e) SET=1-58
Another period of time
One peridod of time
−1
0
1
0.0
0.5
1.0
φphot

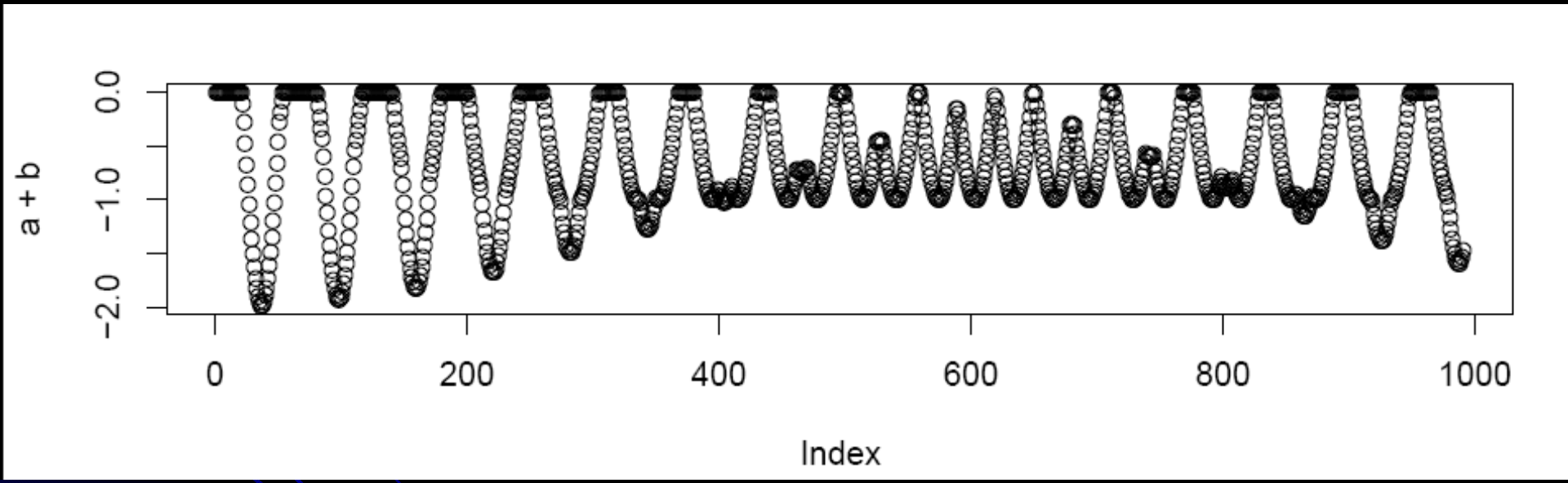
Flip-Flop


AB Dor
Photometric phase
1.5
1.0
0.5
0.0
-0.5
V magnitude
6.8
6.9
7.0
7.1
1980.
1985.
1990.
1995.
2000.
Year

Our phenomena: differential rotation

Different star latitudes rotate with different angular velocities

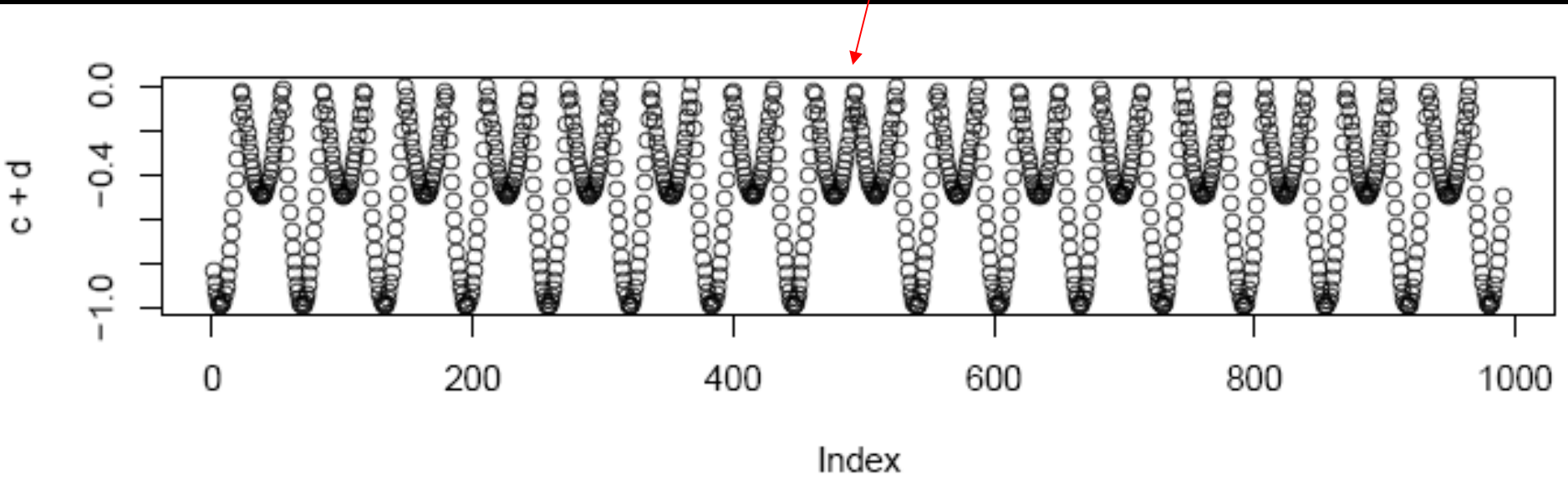
Photometry of differential rotation



-> Smooth variability profile change with time

Photometry of Flip-Flop

“Sudden” change of phase



But – the variability profile remains similar

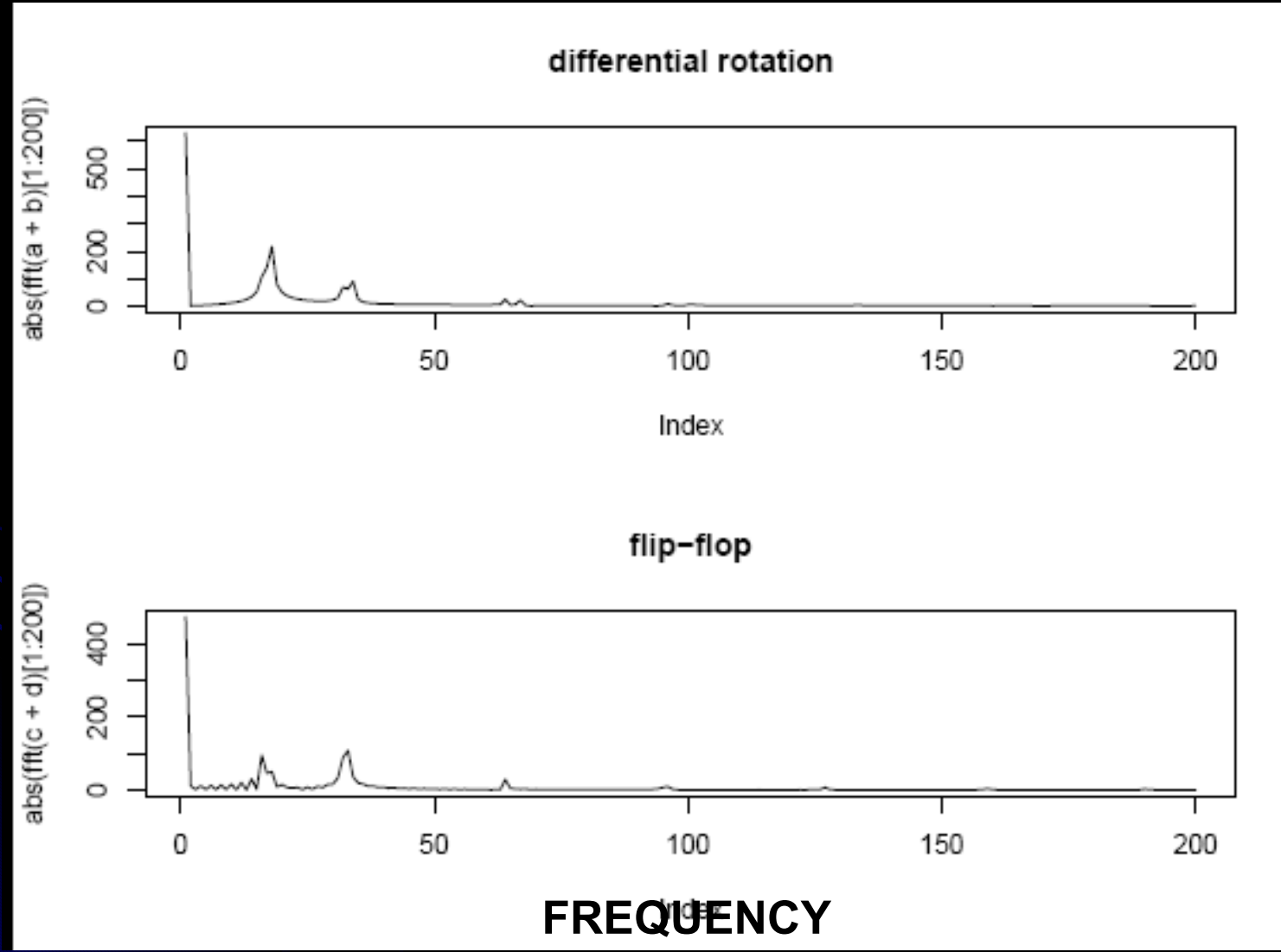
Power spectra – can they be used?

Flip-flop might have rotational frequency and double frequency that we see in power spectra.

Differential rotation will cause double frequency appear at times when the spots are on opposite sides.

So it is difficult to distinguish between them from the power spectra.

Power spectra



Conclusion

We can distinguish between the phenomena of differential rotation and flip-flop based on the long-term observations of the variability shape / lightcurve.

Funny theory

Flip flops could be oppositely wound fields, where, over time, one field is being wound (ie. more spots), and one is being unwound (ie. less spots).