

Art Cox Monopoly Game, by A. Noels

Rules

1. You start on square 1 wondering about a binarity or a pulsation explanation for variable stars.
2. Is a Cepheid an Algol-type star ? ... maybe yes... so you believe in binarity for Cepheids.
3. There are changes in spectral type during the pulsation... Thinking...
- 4.-5.-6. The radial velocity curve is the mirror image of the light curve. You discover the *Phase Lag Discrepancy*... Thinking...
7. Jail. Skip three turns.
8. If you still believe in the binarity explanation for Cepheids after all this thinking, then you better go to jail and stay there...
9. You discover the ε -mechanism. Go directly to square 15 and start thinking about the notion of a critical mass or even of an upper limit to the mass function.
10. You discover the κ -mechanism. Go directly to square 20 and try to explain the location and the extent (well... more or less for the red part) of the Instability Strip.
- 11.-12.-13. Is the κ -mechanism acting in a H, HeI or HeII ionization zone ? Look carefully where this zone is located inside the star and think...
14. You suggest that the modes most likely to be excited are those whose periods are of the order of the thermal time scale of the excitation zone. Congratulations... Go directly to square 24 where you can discuss SPB stars, β -Cephei stars... the whole HR diagram. Aren't your initials A.N.C. ?
- 15.-16.-17. For the notion of a critical mass, you still have to understand the role of Γ_1 , of $\frac{\rho_c}{\rho}$... Keep trying...
- 18.-19. You have the satisfaction of computing a value for the critical mass of hydrogen burning stars and for helium burning stars.
20. Now you understand the Instability Strip. Relax...
21. Cepheids are losing some of their secrets.
22. RR Lyrae stars too...
23. δ Scuti stars, well, how about the selection of modes ?
24. SPB and β Cephei stars, not too bad... You're doing better.
25. LBV ??
26. WR ?? Go back to square 19 and think a little bit about the critical mass.
27. 51 Pegasi. You look carefully to the *only one line with no error bar* and you think very hard. Is it a binarity or a pulsation explanation ? Binarity would mean a planet... Well, you've heard something like this before... Go back to square 1 and keep trying all over again...
- 28.-29. Big surprises still await you.

During the whole game, you can always ask for a *chance card* and skip your turn. These cards can buy you a key to the interaction between pulsation and convection or introduce you to strange modes or give you a little help from Art Cox... Just ask him...

