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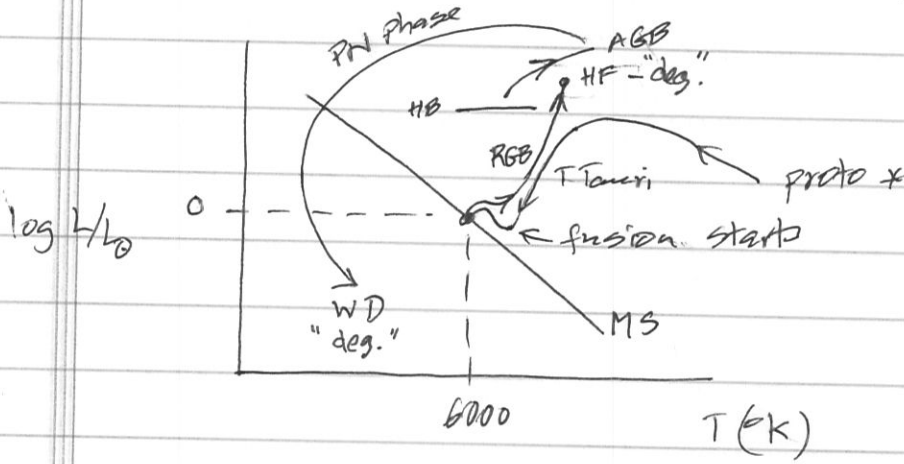
# Review - Exam 2



THE UNIVERSITY  
of  
**WISCONSIN**  
MADISON

## Stars & Stellar Evolution

(17)



Low Mass

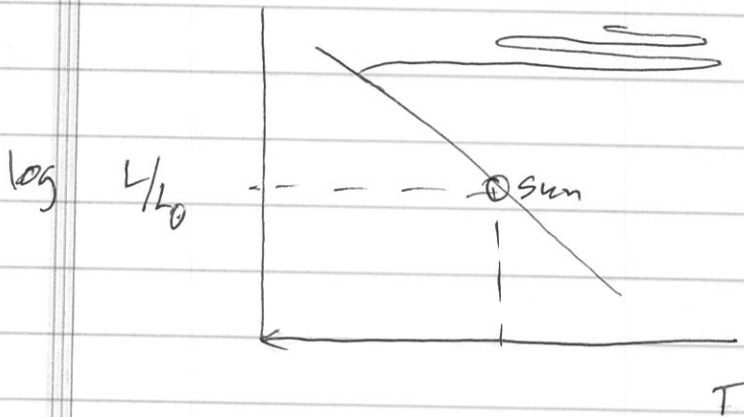
$M < 1-2 M_{\odot}$

## SNe and neutron stars

(5)

## degenerate matter

(4)



High Mass

$M > 5-6 M_{\odot}$

burns  $\rightarrow$  Fe core + onion skin  
collapse, increasing degeneracy  
inverse beta decay  $\rightarrow$  neutrons  
bounce (why?)

$\rightarrow$  SNe (II)  $\rightarrow$  chemical enrichment

$\rightarrow$  NS (pulsars)

Other:

Type I } what and how?  
Novae

Milky Way (4) 
 flat rot. → disk + bulge + halo  
 round →  
 round, dark ← mostly
   
 spiral arms - what are they? how made?  
 ⊕, ⊙: where? 8 kpc out in 12-15 kpc disk

Stellar Pops. (4) 
 { young \*s  
 metal rich  
 in disk  
 flat rot.  
 diffuse
  
 { old \*s  
 metal poor  
 in bulge ± disk  
 round, rand. orbits  
 concentrated

Galaxies (6) Hubble Sequence - perfect?  
 bulge → disk  
 old no gas ← disk  
 old + young gas, dust, SF → star formation

Black Holes and General Relativity (4) • What defines BH?  
 event horizon,  $v_{esc} = c$   
 • time dilation, grav. redshift ∞ for BH  
 • curved space = gravity  
 • Are BH cosmic vacuum cleaners?  
 Sun →  $R = 3 \text{ km}$   
 BH? Earth's orbit?

AGN (6) • Why massive BH?  
 small, massive, energetic  
 • Long or short lived?  
 • evolve? why hard to tell?  
 in all galaxies?

Does MW have central BH?