

First Test, Chapters 1 - 5, some of Chapter 6

Friday, September 17 (Review sheet next Wednesday)

No office hours today - special meeting on Dark Energy

Help Session with Mike Dunham at 5 today may be in different room (conflict with Astronomy Students Association) check with Mike in RLM 15.216B

Astronomy in the News - capture of the returning Genesis probe that collected interplanetary dust - Today. *Parachute malfunction, crashed into Dugway desert Utah.*

Pic of the day

§5.3 Origin of Cataclysmic Variables

Cataclysmic variables often have a main sequence companion transferring mass -- how can this be?

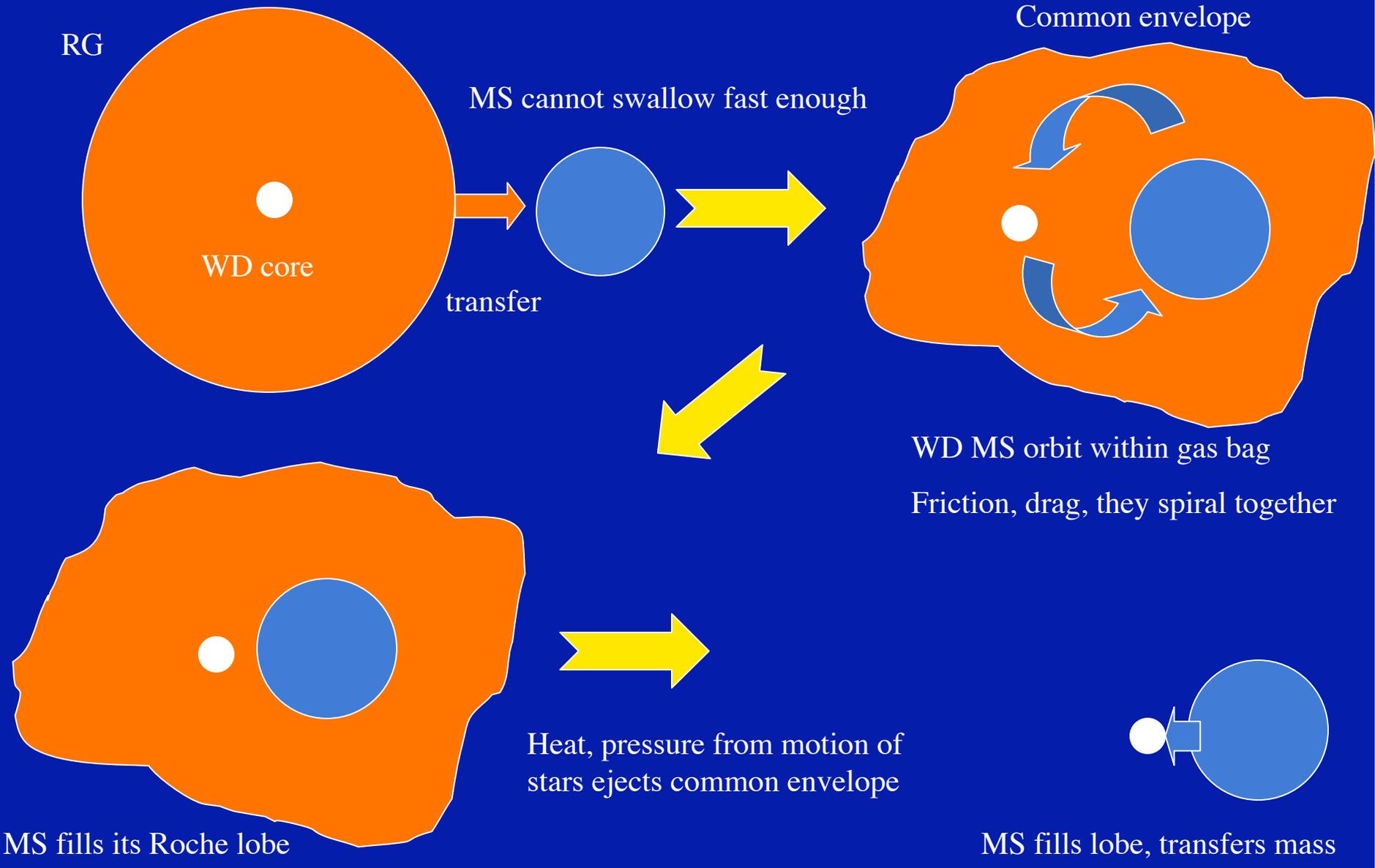
The two stars must once have been far apart to allow the originally more massive star to make a red giant with a white dwarf core.

Need room!!

The stars are observed now to be close together with the main sequence star filling its Roche lobe.

The main sequence star has not expanded to become a red giant, how come it is filling its Roche lobe?

Answer: § 3.9 Common Envelope Evolution



§ 5.4 Final Evolution of Cataclysmic Variables

Some CVs have managed to reach large masses

$M_{\text{wd}} \sim M_{\text{ch}}$ like U Sco

If get close enough to M_{ch} , attain high density,
ignite carbon in center

Quantum Deregulated \rightarrow violent explosion

Supernova (Chapter 6)

What CVs reach M_{ch} ?

Not classical novae

explosion of surface H shell also rips off a bit of the
WD mass - we see excess carbon & oxygen in
ejected matter

WD shrinks in mass rather than grows.

Likely outcome in this case - 2nd star finally burns out H, tries to form
red giant, likely makes a 2nd common envelope \Rightarrow Two WDs!

Clearly some systems like U Sco escape this fate - How?

Recent work suggests that transfer of mass at just right rate allows the H layer to stay hot, *thermal pressure, regulated*

H burns to He, He to C and O that are added to WD

M_{wd} grows in C/O mass

A binary system could be a classical nova for some time then accrete faster, grow to M_{ch}

Some WD explode, some don't

We still don't fully understand why...