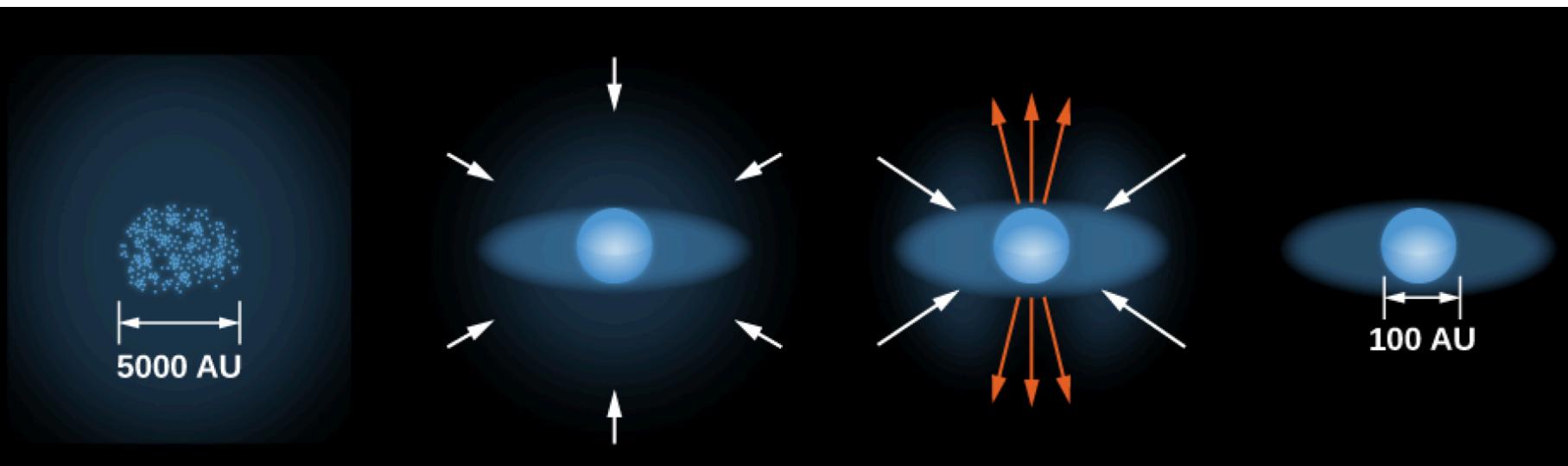


The same nebula can appear in both emission at one wavelength and absorption at another wavelength

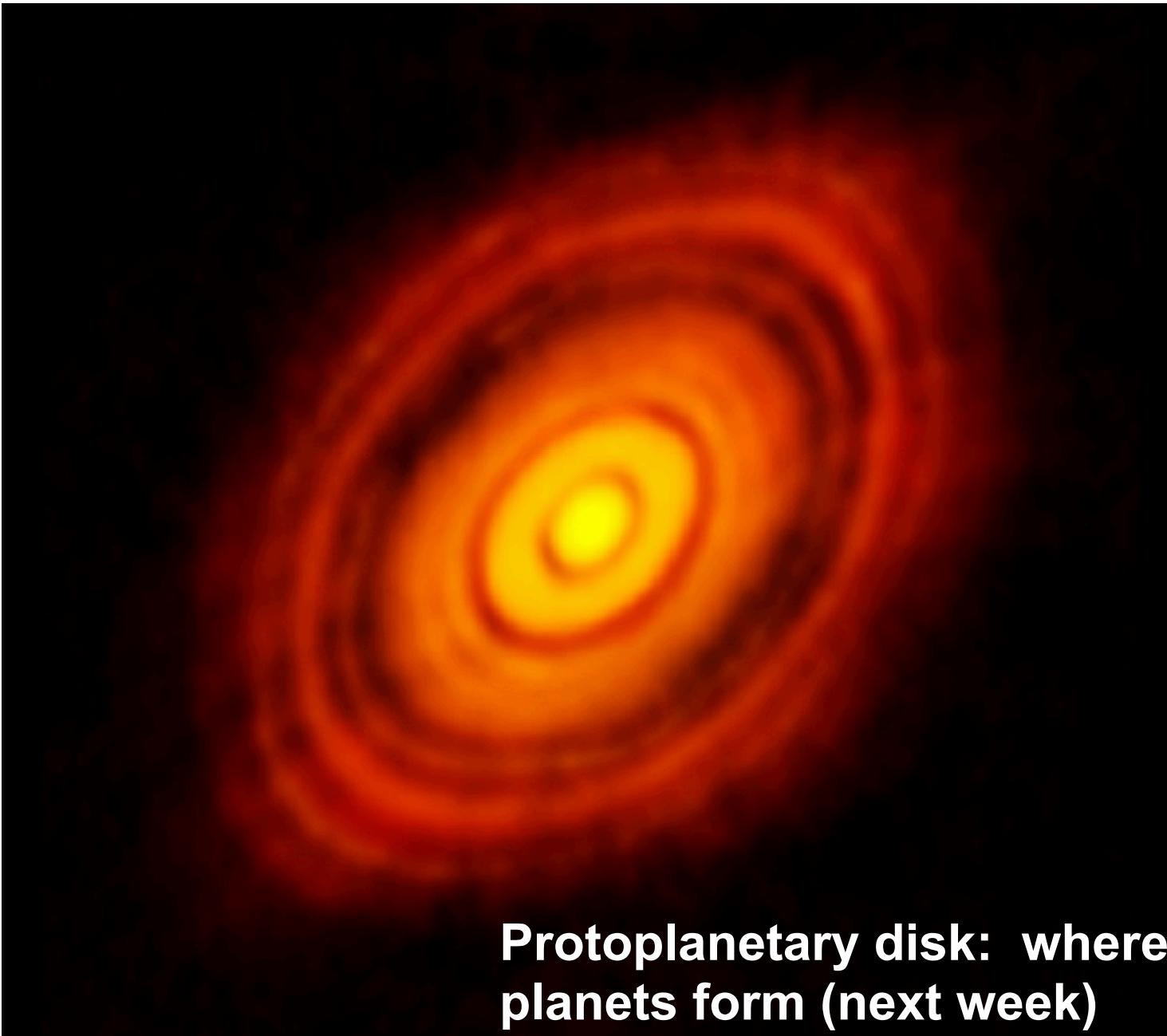
Steps of star formation:

- 1) Region is dense enough to be gravitationally unstable and collapse
- 2) Protostar forms, with envelope and disk
- 3) Star grows, leads to jets and outflows
- 4) Envelope and disk disappear, leaving behind planets +star

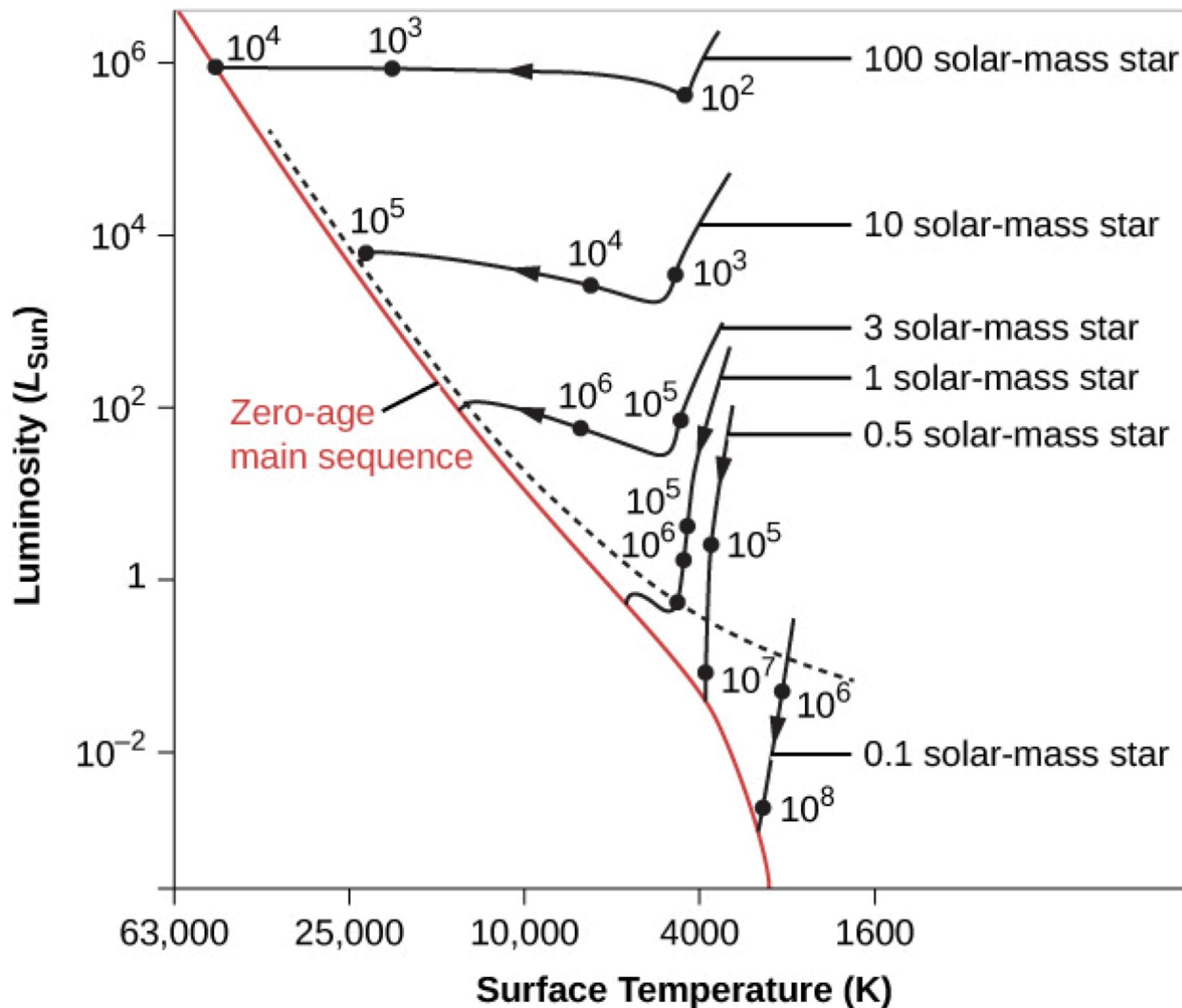


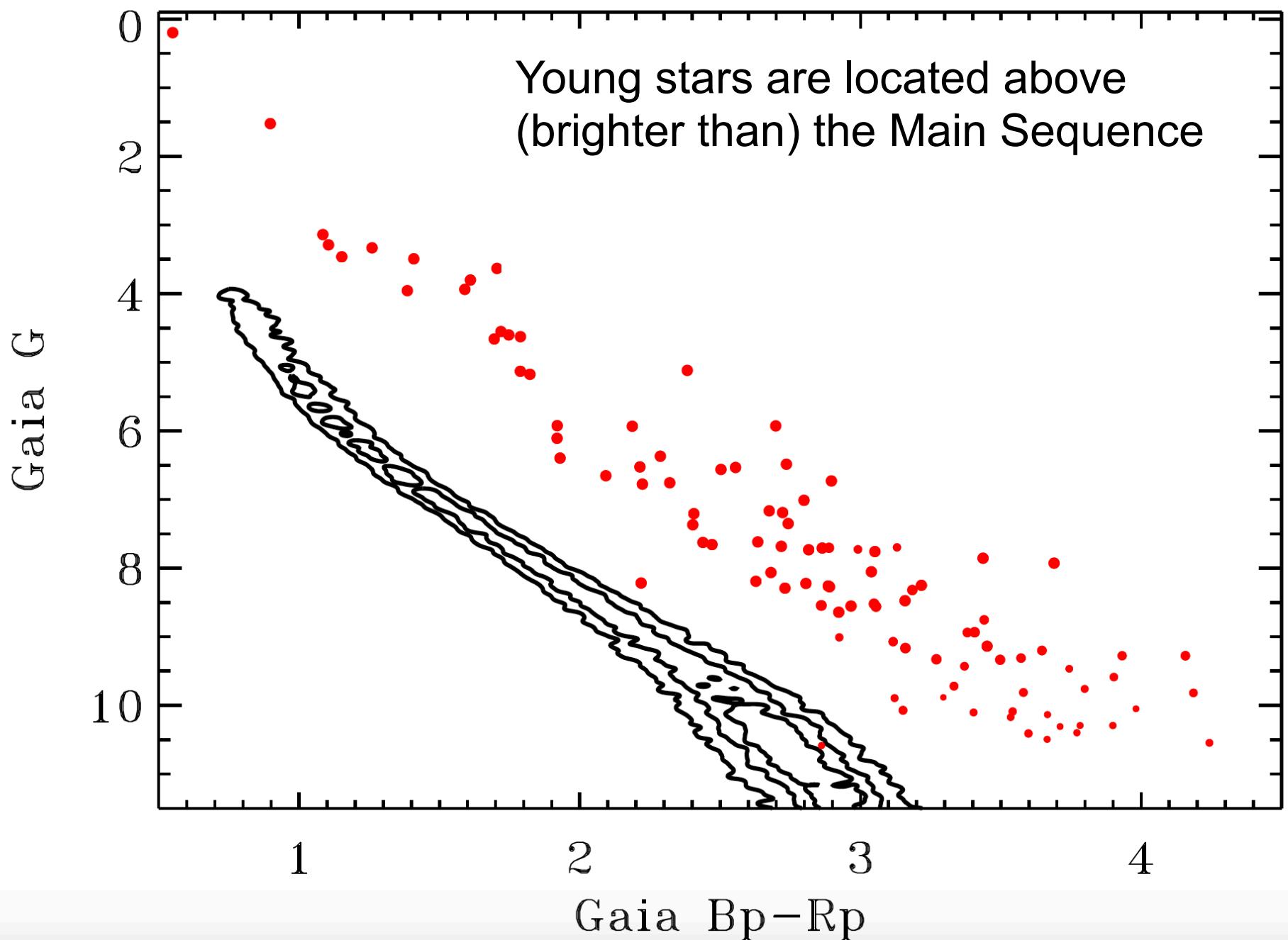


Rosette Nebula
Far-infrared: dust in emission



**Protoplanetary disk: where
planets form (next week)**

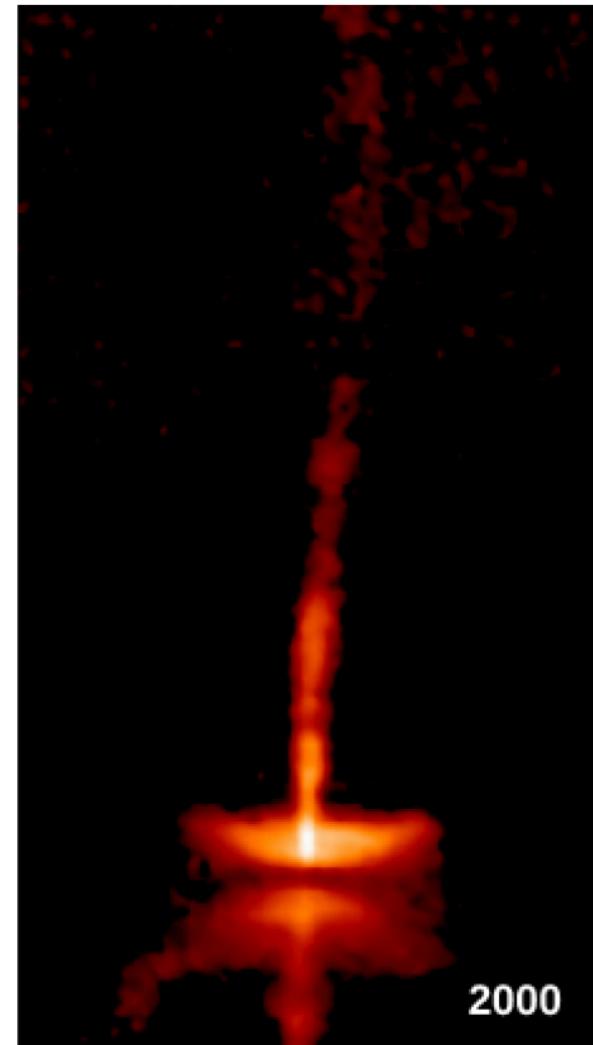
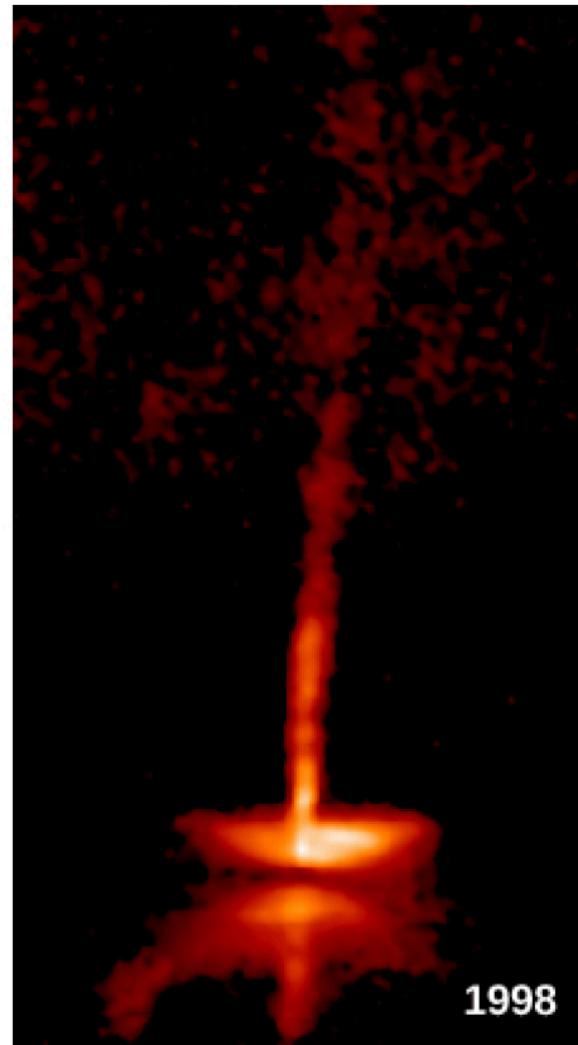
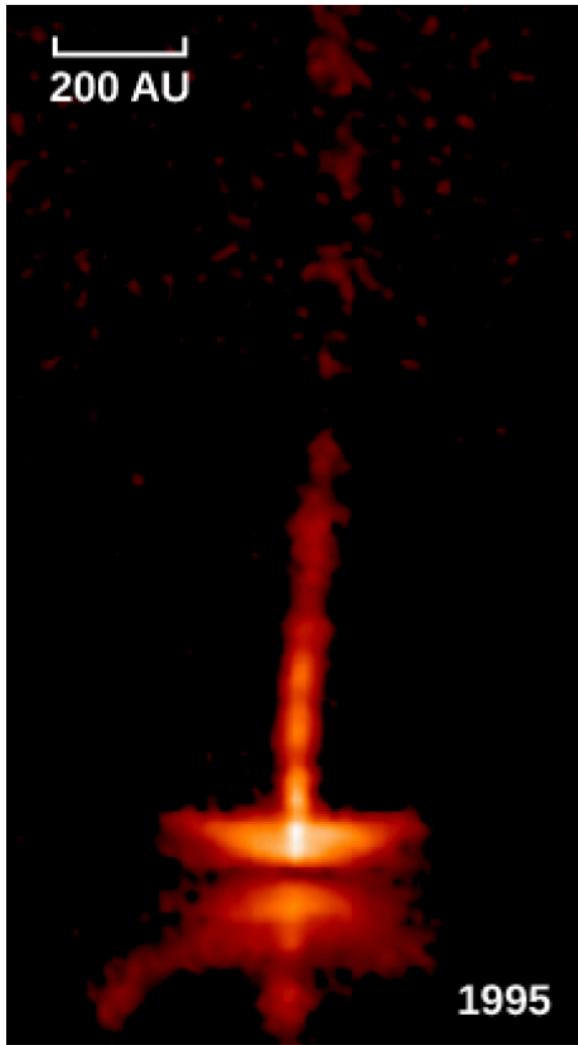


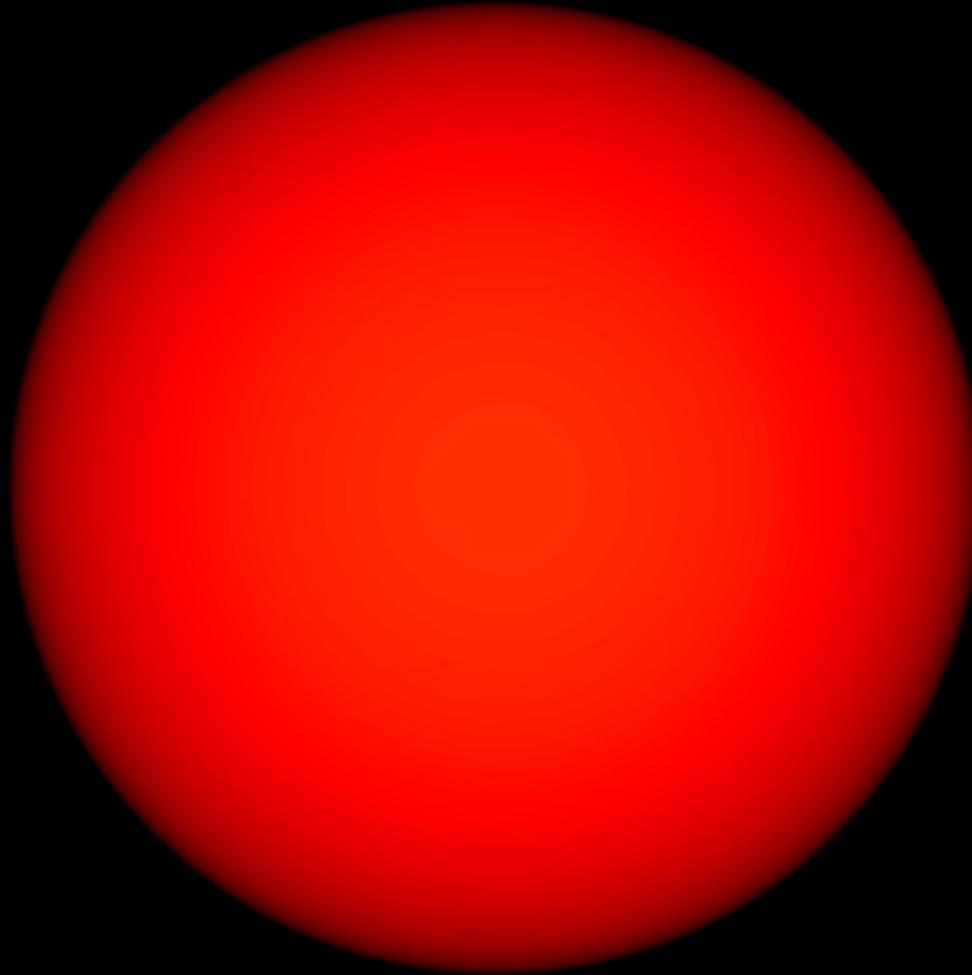


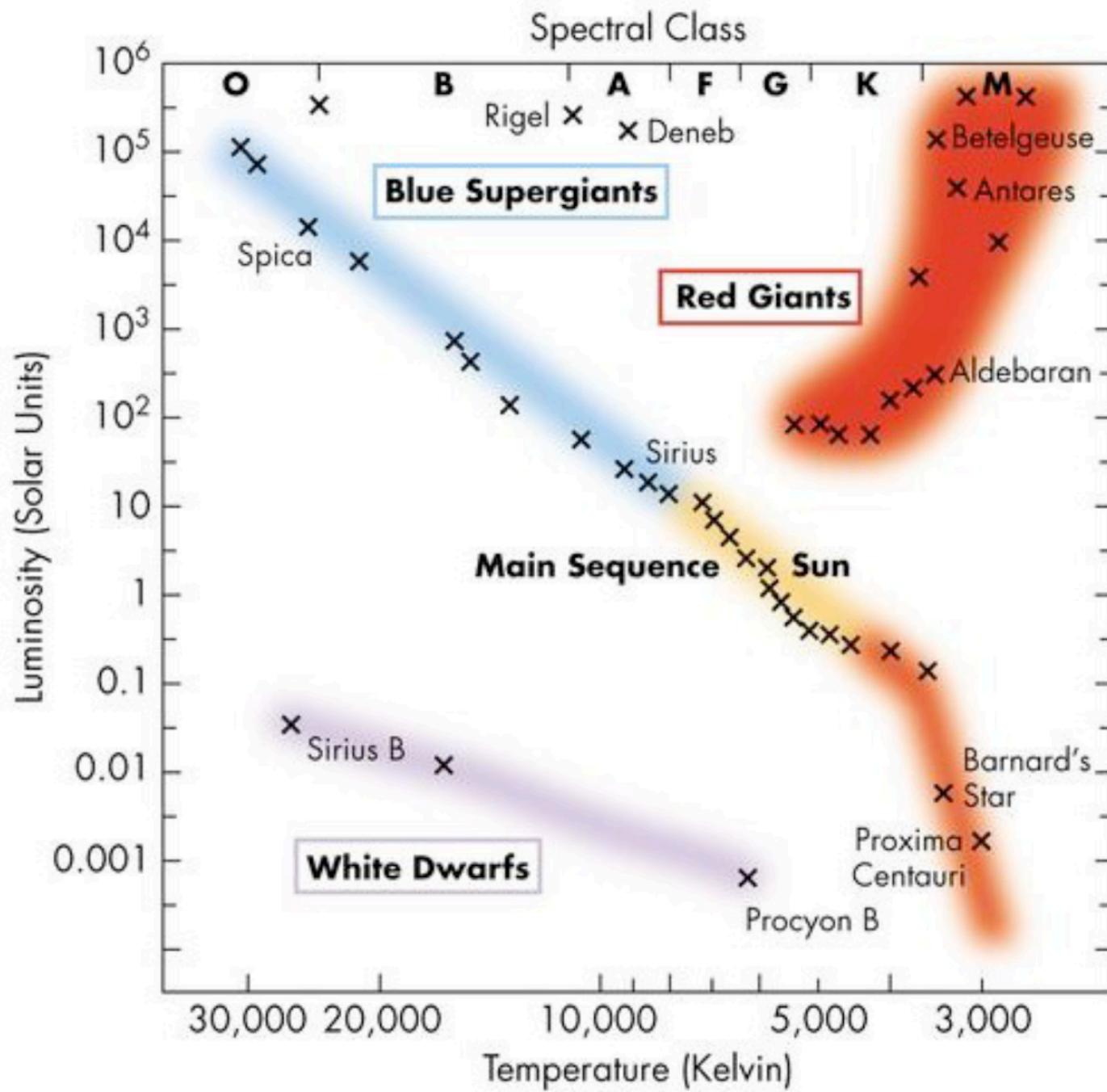
Jet from a young star

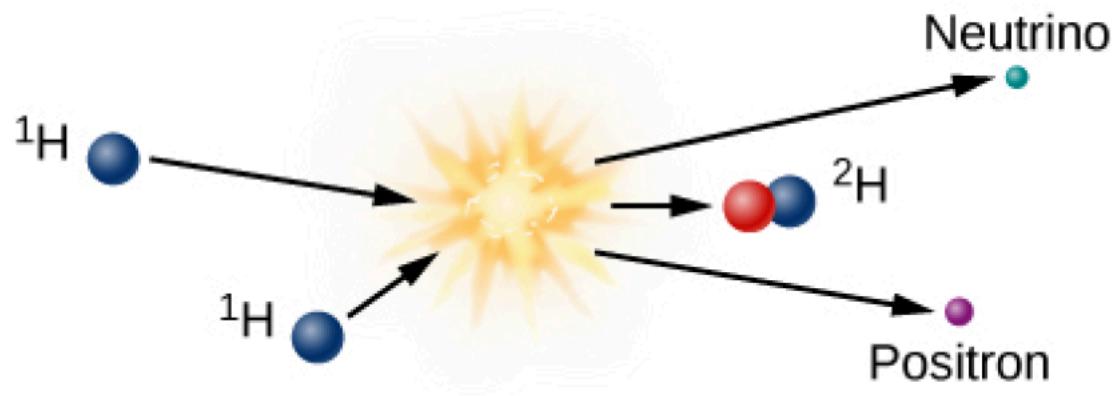


Jet from a young star: moving with time!

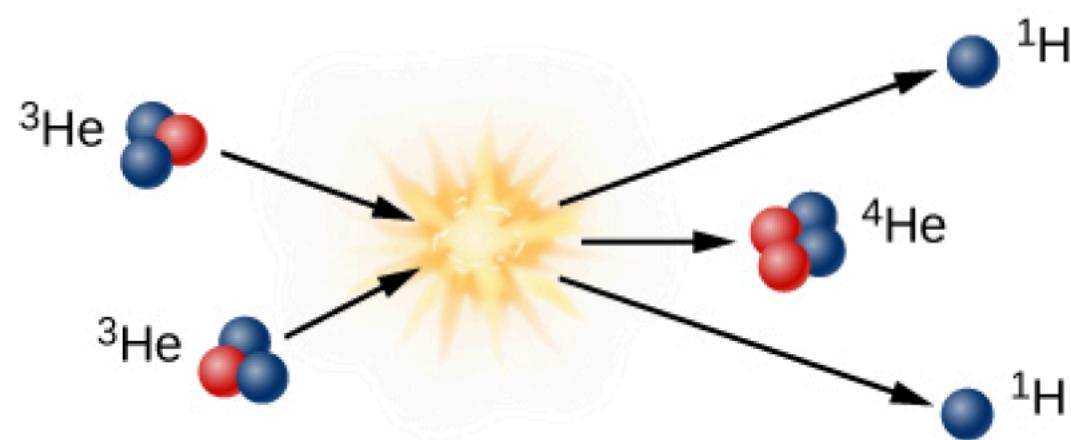
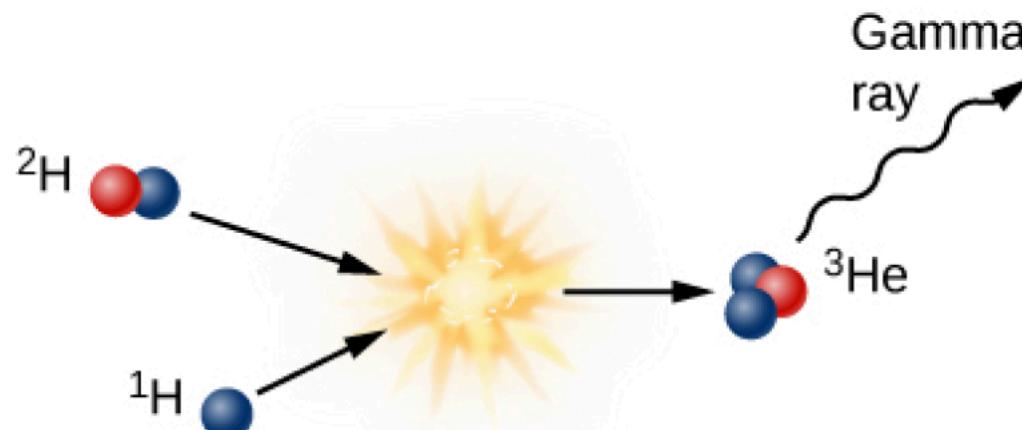


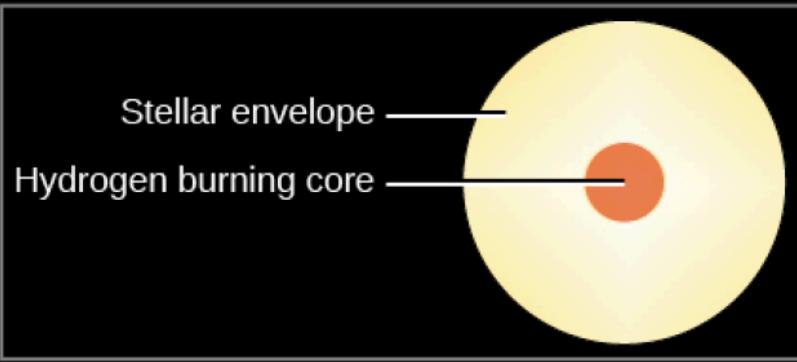




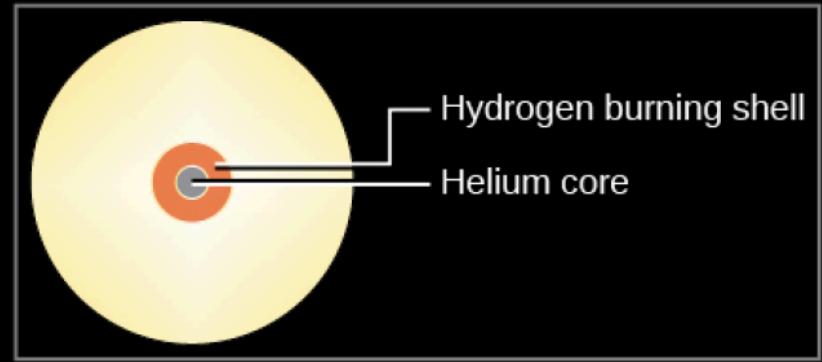


Fusion at core
4 Hydrogen atoms
turns into 1 He atom





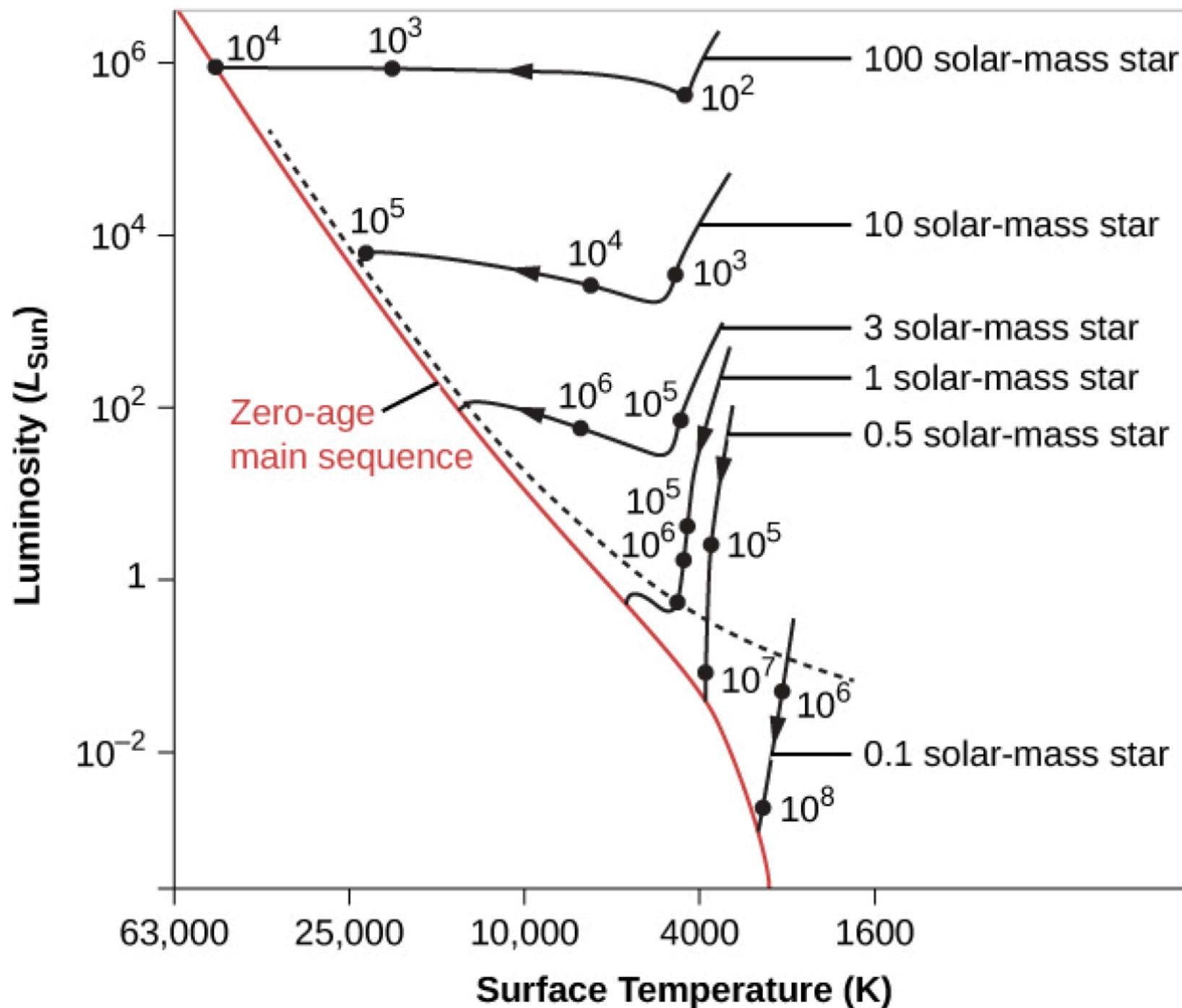
(a)

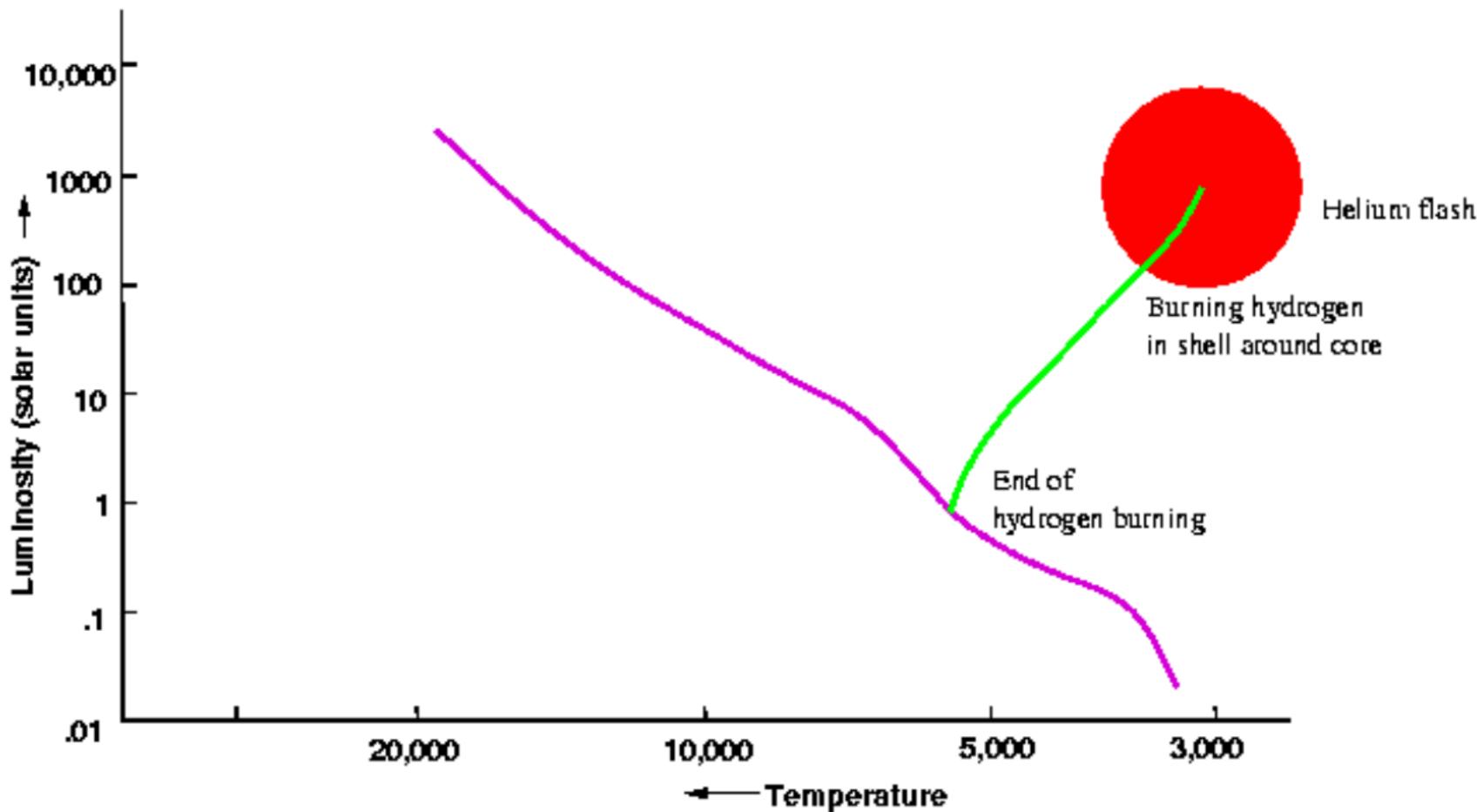


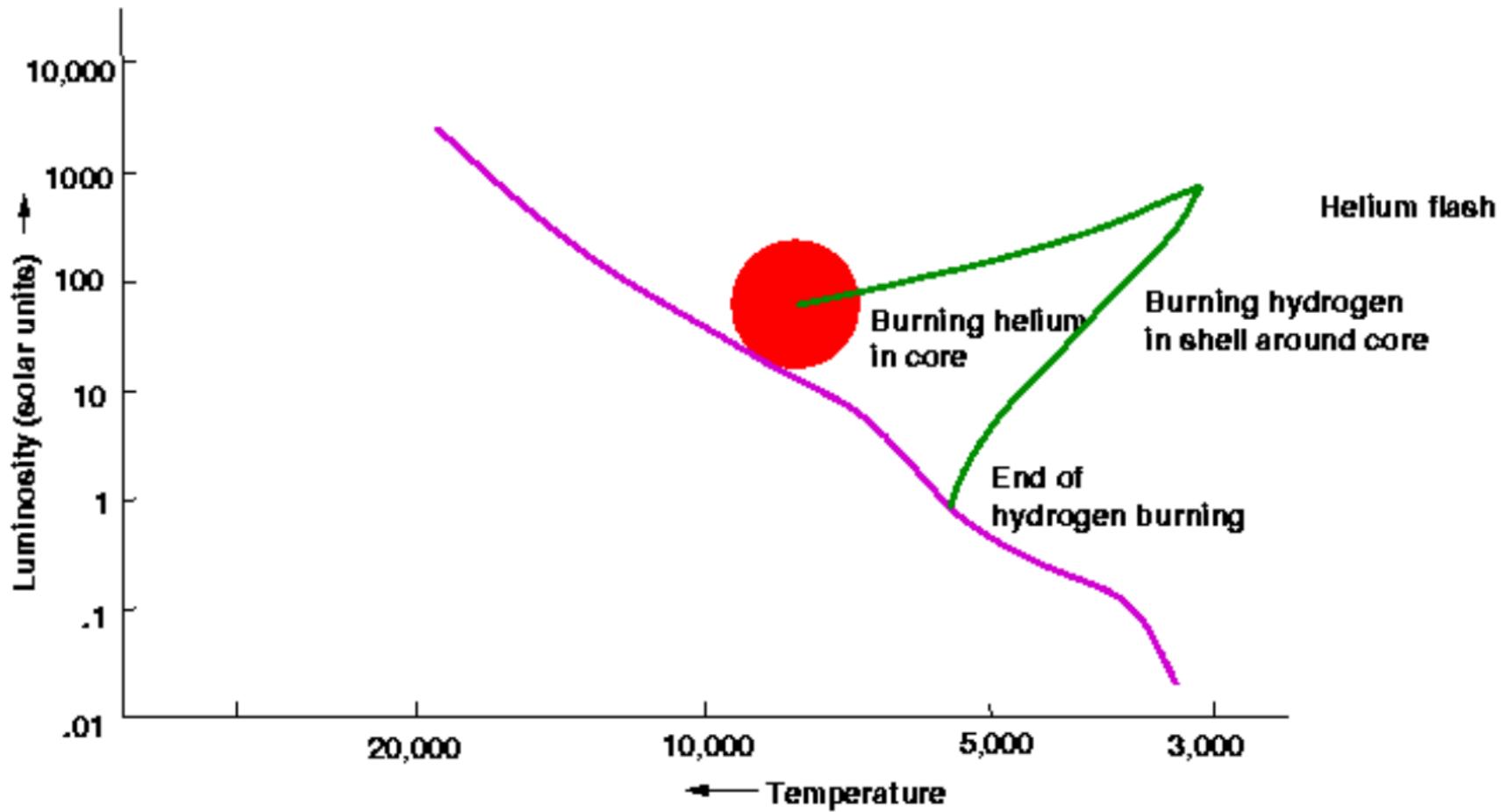
(b)

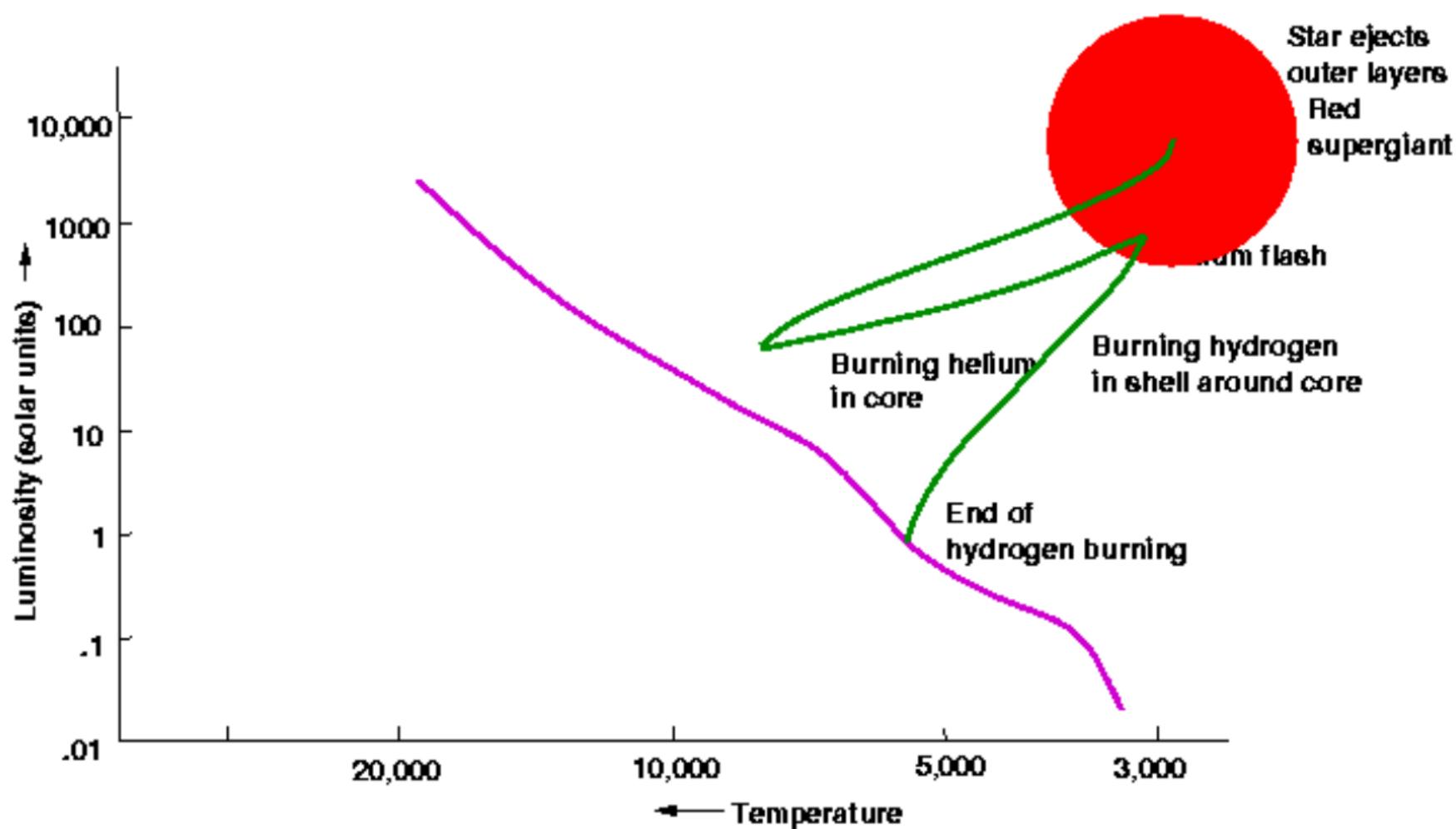
**Main sequence: Hydrogen
burning in core**

**What happens when the core
runs out of Hydrogen?**

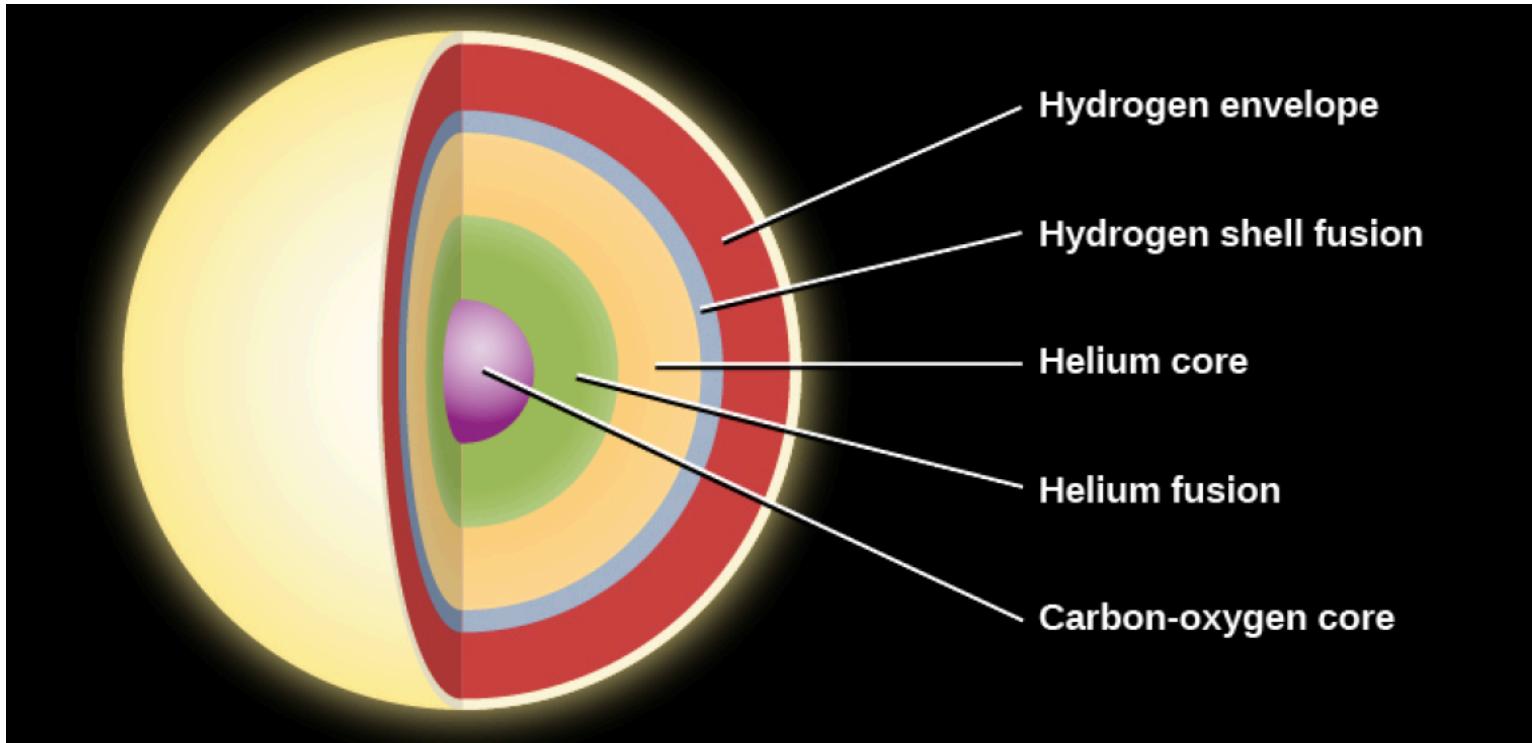


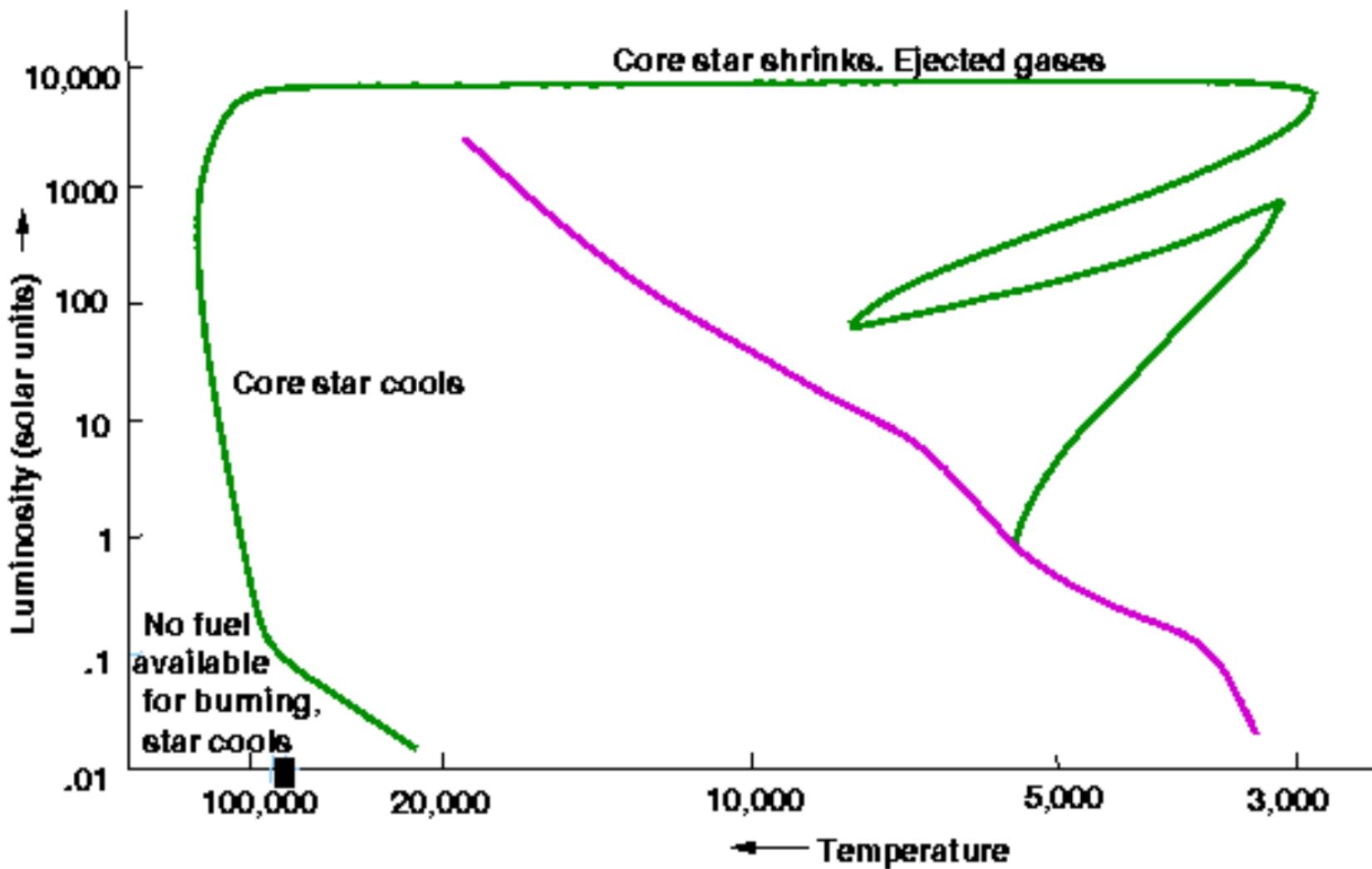






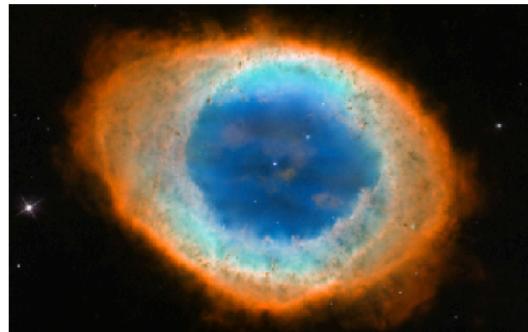
Interior structure of evolved star; Will lose the envelope (outer region)





Stage	Time in This Stage (years)	Surface Temperature (K)	Luminosity (L_{Sun})	Diameter (Sun = 1)
Main sequence	11 billion	6000	1	1
Becomes red giant	1.3 billion	3100 at minimum	2300 at maximum	165
Helium fusion	100 million	4800	50	10
Giant again	20 million	3100	5200	180

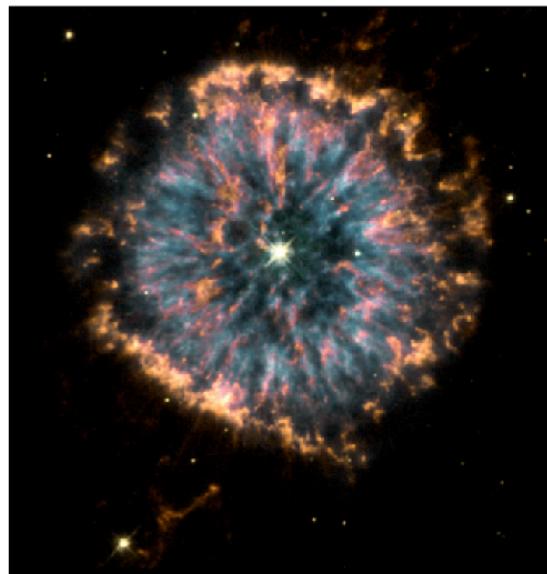
Planetary nebula: lost envelopes,
only core is left; we see lost material



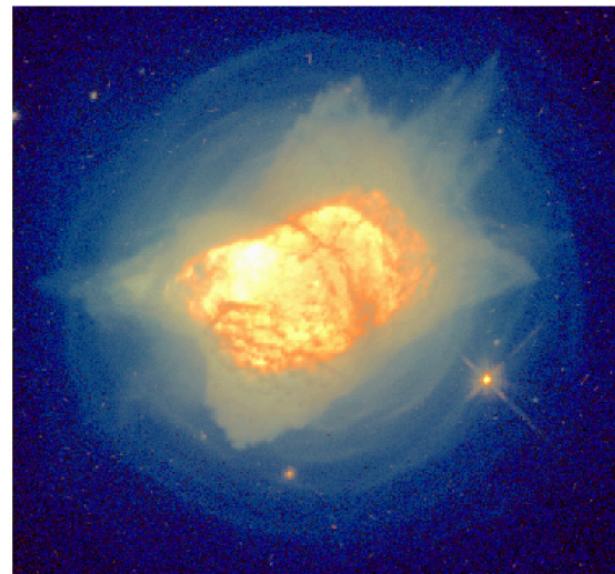
(a)



(b)



(c)



(d)