Monday, February 29, 2016

Exam 2, Skywatch 2, returned Wednesday.

Reading for Exam 3:

Chapter 6, end of Section 6 (binary evolution), Section 6.7 (radioactive decay), Chapter 7 (SN 1987A)

Background in Chapters 3, 4, 5.

Background: Sections 3.1, 3.2, 3.3, 3.4, 3.5, 3.8, 3.10, 4.1, 4.2, 4.3, 4.4, 5.2, 5.4 (binary stars and accretion disks).

Astronomy in the news?

Fast Radio Bursts – last thousandths of a second, discovered in radio data long after the fact, site unknown, distance unknown, power unknown.

Fast Radio Burst

Last week, announcement of the discovery of a “live” one, followed by an “afterglow” lasting about a week, allowing follow-up observations to locate the source with an optical telescope.

In an elliptical galaxy six billion light years away.

From distance, know luminosity, comparable to a supernovae for a very brief time, and the energy, about a trillion times smaller than a supernovae.

Great progress, but mechanism still unknown…

Goal

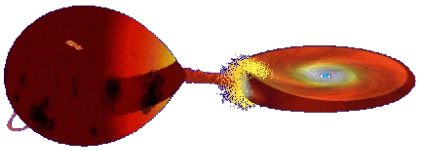
To understand how stars, and Type Ia supernovae, evolve in binary systems.

First star evolves, sheds its envelope, leaves behind a white dwarf.

Then the second star that was ***originally*** the less massive evolves, fills its Roche Lobe and sheds mass onto the white dwarf.

The white dwarf is a tiny moving target, the transfer stream misses the white dwarf, circles around it, collides with itself, forms a ring, and then settles inward to make a flat disk.

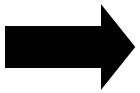
Matter gradually spirals inward, a process called ***accretion.***

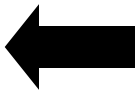
$\Rightarrow$ the result is an ***Accretion Disk*** (Chapter 4). 

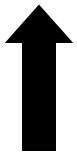
An accretion disk requires a transferring star for supply and a central star to give gravity, but it is essentially a separate entity with a structure and life of its own.

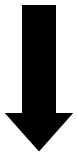
One Minute Exam:

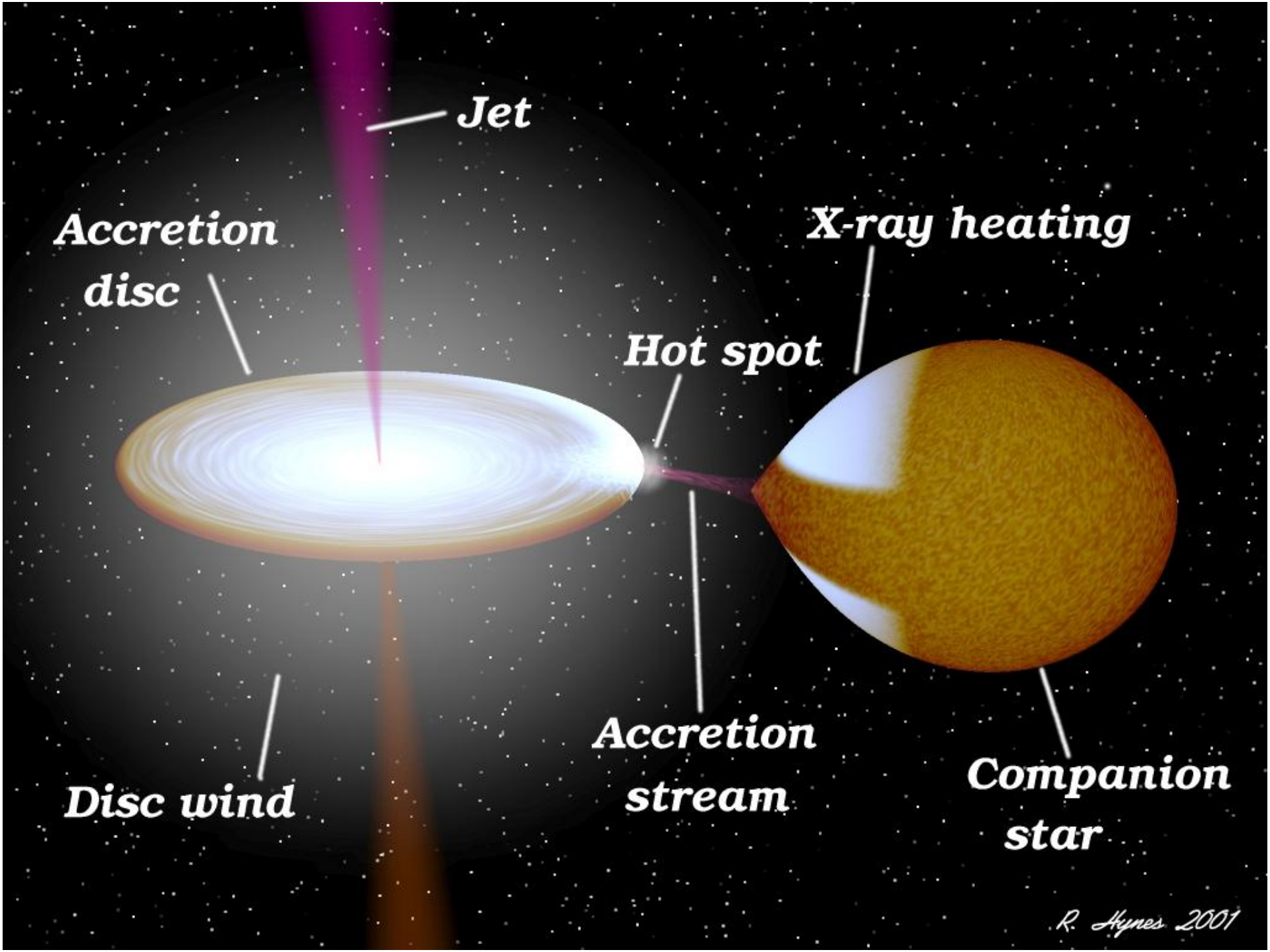
Two stars are born orbiting one another in a binary system.
Which star will transfer matter first?

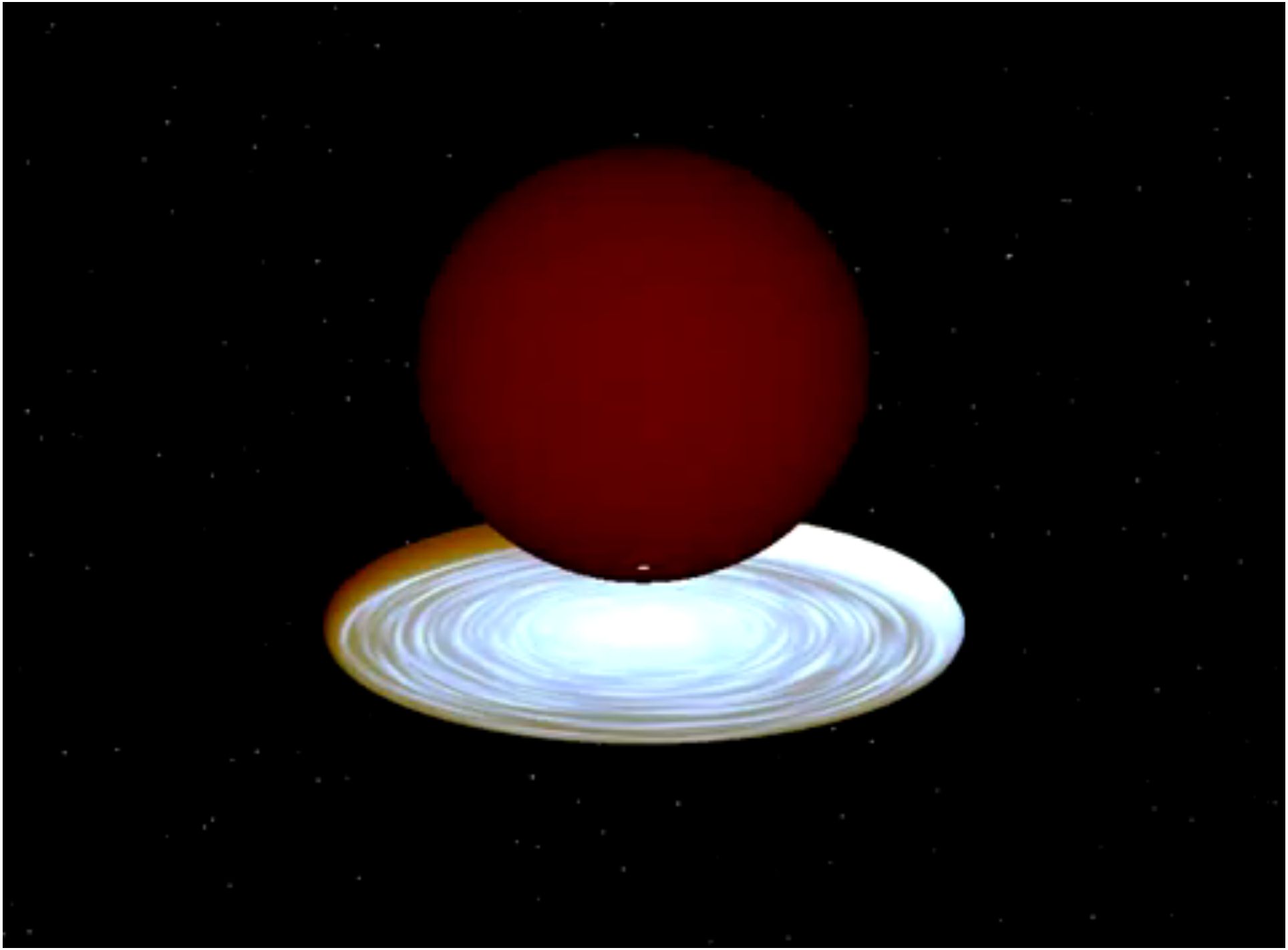
 The most massive star

 The least massive star

 The one with the smaller Roche lobe

 The one with the smaller radius


Jet
Accretion disc
X-ray heating
Hot spot
Disc wind
Accretion stream
Companion star
R. Hynes 2001



Which star is the most massive?

Goal

To understand how accretion disks shine and cause matter to accrete onto the central star.

Basic Disk Dynamics - Figure 4.1