AST 105: Introduction to the Solar System

HOMEWORK # 8, DUE 16 April

1. What seems to be the main factor accounting for the formation of jovian planets instead of terrestrial planets in the outer parts of the solar system?
2. Jupiter is more massive than Saturn and also has a larger radius. However, planets much more massive than Jupiter have smaller radii. From the figures in the book, what mass planet seems to have the largest radius?
3. Why aren’t the jovian planets completely spherical?
4. Why do Jupiter and Saturn radiate twice as much energy as they receive from the Sun?
5. Why does Jupiter have a large magnetic field, given that it does not have a large rocky metal core like the Earth?
6. What is the major source of heating for Jupiter’s Galilean satellites?
7. What are two reasons we think Europa has a subsurface ocean, probably water?
8. Why does Titan have a thick atmosphere, while other large moons, including Ganymede which is even larger than Titan, do not?
9. What are the two major causes of gaps in ring systems, such as Saturn’s rings?
10. It is expected that all jovian planets will have at least a small ring system. Why? Why does Saturn have the most outstanding ring system even though it is not the largest jovian planet?