

Physics of Planetary Systems — Exercises

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Set 10

Problem 10.1

CoRoT and Kepler are observing stars down to 16th relative visual magnitude. What is the maximum distance to which the following stars can be observed: (a) an M0V star with an absolute magnitude of +9.0 mag, (b) a G0V star with an absolute magnitude of +4.4 mag, (c) an A0V star with an absolute magnitude of +0.7 mag. Relate these distances to the Milky Way's radius of 15 kpc. (2 points)

Problem 10.2

The sun is orbiting the galactic center in a nearly circular orbit. Suppose that it was orbiting in an highly eccentric orbit that takes it close to the galactic center. Describe what could happen to our solar system. (2 points)

Problem 10.3

Draw a scheme to depict different phases of the solar system formation and physical processes typical of each phase, according to the standard scenario. Viscous accretion of a gas disk, dust growth and drift, runaway and oligarchy of planetesimals, isolation of embryos, gas accretion, formation of terrestrial planets and so on—as much as you have learned should be there! (2 points for a simple, yet correct, scheme; 4 points for a detailed, well-thought one)

Problem 10.4

List open questions, difficulties, unsolved problems in the state-of-the-art planet formation theories (2 points + extra points; 0.25 points for every item on your list)

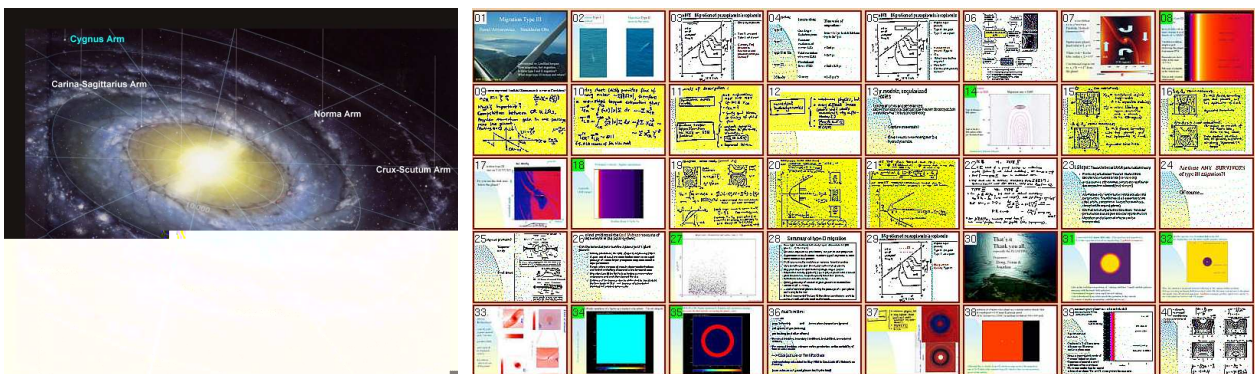


Figure 1: (Left) The Milky Way. (Right) Theorists don't give up: a conference talk of one of them.