Astronomy 131 Review for Exam 1

Chapter 46: Exploring the Solar System. Using light to understand objects in the solar system. Spacecraft, the reasons to build spacecraft, the different types and styles of missions.

Chapter 2: The Origin of the Solar System. Immanuel Kant and the solar nebula hypothesis. Solar nebula, how it forms. The basic theory for how the solar system, the sun and the planets formed. Bipolar outflows, protoplanetary disks. Temperature differences in the early solar system, Formation of rocky planets vs. gaseous planets.

Chapter 4: The Sun. Its internal structure. Its power source. Proton-proton chain and nuclear fusion. Its chemical composition. The Solar Neutrino problem. Energy transport in the Sun. The Sun's atmosphere. Solar activity and the relationship with magnetic fields. Motions of gas inside the Sun. Heating the corona and solar wind. The effects of the Sun on the Earth. Faint-Young-Sun paradox.

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Surfaces and Interiors of the Terrestrial Planets

The terrestrial planets have a number of similarities and differences, which can be explained by the relative importance of 5 primary factors during the history of each of the planets:

Impact cratering
Volcanism
Tectonism
Differentiation
Internal heat supply

Mercury

Spin-orbit coupling-- every 2 orbits = 3 spins on axis. Surface temp. 740 K towards the Sun but only 90 K away from the Sun. Extensive cratering record. Two terrain types, highlands (with intercrater plains) and lowland plains. Secondary craters created by ejecta of planetary bombardment. Lowland plains appear inside impact basins, impact melt vs. volcanic flow. Very large core for its size, core is now solid, high density. Regolith on surface, possibility of water. Origin due to catastrophic impact.

Venus

Similar size as Earth, lots of greenhouse gases, surface temperature 750 K. Cloud cover prevents visual observation of surface. Venera and Pioneer Venus missions, Magellan orbiter. Cratering record reveals that the surface is young. Surface renewed by volcanism. Equilibrium hypothesis vs. catastrophe hypothesis. Craters have irregular appearances, indicating influence of atmosphere. Basaltic surface, shield volcanoes, lava domes, coronae. Lack of plate tectonics, crust motions due to upwellings and collapsing of crust, canyons, ridge belts.