

Planetary Formation: From The Earth-Moon System To Extrasolar Planets

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An overview of current theories of planetary growth, emphasizing the formation of habitable planets, is presented. These models are based upon observations of the Solar System and of young stars and their environments. They predict that rocky planets should form around most single stars, although it is possible that in some cases such planets are lost to orbital decay within the protoplanetary disk. Terrestrial planets are believed to grow via pairwise accretion until the spacing of planetary orbits becomes large enough that the configuration is stable for the age of the system. Giant planets begin their growth like terrestrial planets, but if they become massive enough before the protoplanetary disk dissipates, then they are able to accumulate substantial amounts of gas. Specific issues to be discussed include: (1) how do giant planets influence the formation and habitability of terrestrial planets? (2) could a giant impact leading to lunar formation have occurred ~ 100 million years after the condensation of the oldest meteorites?