

Formation of Giant Planets: Dependences of Some Parameters on the Critical Core Mass

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A large amount of gas envelope (which is composed of hydrogen and helium) of giant planets is considered to form as a result of rapid accretion of nebular gas which occurs when a solid core grows to be a critical mass. Some previous works concluded that the value of the critical mass is about 10 Earth's mass. However, all of the detected extrasolar giant planets exist in the inner region of planetary system where such a massive core cannot form because of lack of solid materials. In this study, we reinvestigated the critical mass over a wide range of the parameters included in the formation model. We found that even a 1 Earth's mass core can initiate the rapid gas accretion in some case.