

The in situ formation of giant planets in dense nebulae

Masahiro Ikoma[1], Hiroyuki Emori[2], Kiyoshi Nakazawa[3]

[1] Earth and Planetary Sci., Tokyo Inst. Tech., [2] Earth and Planetary Sci., Tokyo Tech., [3] Earth and Planetary Sci., Tokyo Inst. Tech

<http://www.geo.titech.ac.jp/nakazawalab/mikoma/mikoma.html>

In most of the detected extrasolar systems, the giant planets (i.e., Jupiter-like planets) are orbiting very close to their central stars, while such planets exist in the outer parts of our solar system. To explain such difference between planetary systems, we have investigated the influence of difference in the physical properties of planet-forming nebulae (i.e., density and temperature of nebular gas) on the formation process of the giant planets. We have found that the detected giant planets could form at their present locations, if the nebulae were about 10 times as massive as the minimum-mass solar nebula in which our solar system is considered to have formed. Such massive nebulae have already been detected.