Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

PPS020-P20 Room:Convention Hall Time:May 25 10:30-13:00

A Systematic Study of the Mass-Density Relation for hot-Neptune

Kenji Kurosaki[1*], Masahiro Ikoma[1], Yasunori Hori[1]

[1]Earth and Planetary Sciences,TokyoTech

Recent progresses in transit photometry have enabled us to find short-period low-mass exoplanets with mass of several to several ten Earth-masses. If combined with radial-velocity measurements, both planetary mass and radius, namely planetary mean density, are determined. With the measured value of mean density, we can infer the composition and interior structure of a transiting planet, which give insights into the origin and evolution of the planet. Of about 100 exoplanets with measured masses and radii, while most of them are hot-Jupiters that are composed predominantly of hydrogen like Jupiter and Saturn, several planets are known to be water-rich like Uranus and Neptune. In this study we have simulated the interior structure and thermal evolution of planets composed of H2O, taking mass loss driven by intense stellar X-ray and UV irradiation into account. Then we have derived mass?density relationships for hot-Neptunes. Our prediction will be useful to be compared with future observations, which will improve our understanding of the origin and evolution of water-rich planets.

Keywords: extrasolar planets, planetary evolution, ice giant planets, water