The 52th GRC International Frontier Seminar

Title: ***Ab initio*** **equation of states for planetary and exoplanetary modeling**

Speaker: Dr. Stephane Mazevet

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Date: **12.17.2014 (Wed.) 16:00 – 18:00**

Venue: **Meeting Room #385, Science Research Bldg 1, Ehime Univ.**

Using *ab initio* molecular dynamics simulations, we calculate equation of states for five main constituents of planetary interiors: H, He, H_2O, SiO_2 and Fe. These equations of states are multi-phases, include liquid solid phases and for silica and iron a melting curve calculated using the two-phases approach up to 1000 Mbar. Using a physically based parametrization of these results, we calculate planetary models for earth-type exoplanets, ice giants, and giants up to 10 times the mass of Jupiter. We also investigated the state of the core for Saturn and Jupiter and found that the hypothesis of a solid core is not compatible with these new EOS.

References

L. Caillabet, *et al*., Phys. Rev. B **83**, 094101 (2011).
J. Bouchet, *et al*., Phys. Rev. B **87**, 094102 (2013).

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