University of Genova

Department of Earth, Environmental and Life Sciences

Doctorate Course in Earth and Environmental Science and Technology

Università degli Studi di Genova

STAT

Dottorato in Scienze e Tecnologie per l'Ambiente e il Territorio

Titolo

Fisica dei minerali e termodinamica computazionale del mantello terrestre

Title

Computational mineral physics and thermodynamics of the Earth's mantle

Tutor and eventual co-tutor

Prof. Donato Belmonte (donato.belmonte@unige.it)

Program description including the formation program abroad

Physical and thermodynamic properties of Earth's mantle minerals are crucial to understand the dynamics and chemical evolution of our planet. The main goal of this research is to gain original insights on stability relations, phase transitions, melting processes and solid-melt-fluid phase equilibria of mantle minerals in a broad range of P-T conditions (from upper to lower mantle) by multi-scale computational and thermodynamic modelling. A 3- to 6-month mobility period abroad is planned along with collaborations with international research groups (IPGP, Paris; UCL, London; GFZ, Potsdam and others).

Financial support

The research program is supported by a PRIN 2017 project funded by MIUR (Project 2017KY5ZX8)

Tutor's publications (max 3)

Belmonte, D., Ottonello, G., Vetuschi Zuccolini, M., and Attene, M. (2017) The system MgO-Al_2O_3-SiO_2 under pressure: A computational study of melting relations and phase diagrams. *Chemical Geology*, 461, 54-64.

Belmonte, D., Ottonello, G., and Vetuschi Zuccolini, M. (2017) *Ab initio*-assisted assessment of the CaO-SiO_2 system under pressure. *CALPHAD*, 59, 12-30.

Belmonte, D. (2017) First principles thermodynamics of minerals at HP-HT conditions: MgO as a prototypical material. *Minerals*, 7, 183, doi:10.3390/min7100183.