



I the undersigned asks to participate in the public selection, for qualifications and examinations, for the awarding of one type B fellowships at Dipartimento di Fisica, Scientist- in - charge **Prof. Nicola Manini**

Alexis Front

CURRICULUM VITAE

PERSONAL INFORMATION

Surname	Front
Name	Alexis
Date of birth	15/02/1990

PRESENT OCCUPATION

Appointment	Structure
none	none

EDUCATION AND TRAINING

Degree	Course of studies	University	year of achievement of the degree
Degree			
Specialization			
PhD	Condensed matter and nanosciences	Aix - Marseille university	2018
Master	Condensed matter and nanosciences	Aix - Marseille university	2015
Degree of medical specialization			
Degree of European specialization			
Other			



REGISTRATION IN PROFESSIONAL ASSOCIATIONS

Date of registration	Association	City
	none	

FOREIGN LANGUAGES

Languages	level of knowledge
English	B2

AWARDS, ACKNOWLEDGEMENTS, SCHOLARSHIPS

Year	Description of award
Mar. 2019	Scholarship for a short-term scientific mission from international research network on nanoalloys.
Aug. 2016	Scholarship to participate at condensed matter days
Oct. 2015- Oct. 2018	Ph.D. scholarship from french ministry of higher education and research

TRAINING OR RESEARCH ACTIVITY

My thesis subject dealt with modeling of Pt-based nanoalloys including Co-Pt which is a typical ordering system and Pt-Ag which is a hybrid system between ordering and demixion. A focus on the competition between segregation and core ordering was particularly made in order to study the structure and the chemical ordering in nanoalloys.

I first developed a parametrization for interatomic potentials which is an arduous but essential step because all the results of the numerical simulations will depend on it. To achieve this goal, *ab initio* calculation techniques (DFT VASP) has to be mastered to determine data to adjust. Parametrization requires to test a very large number of parameters with a very small number of solution satisfying all the system specifications.

Then I developed new tools (in fortran) to analyse surface segregation and chemical ordering in nanoparticles. I implemented Monte Carlo simulations, using high-performance computing, to evaluate stable phases in the configuration space according to the atomic structure, morphology, composition and size of nanoparticles. These nano-objects are a condensed of metallurgy since its present inequivalent sites in interaction as surface (edge, vertex, (111) and (100) facets) and core. In order to analyse the finite size effect I developed a multi-site approach by comparing the facets behavior to the surfaces one and the bulk behavior to the core one. In the case of Pt-Ag, I implemented Molecular Dynamics to analyse stress map in several stable structures preliminary determined by Monte Carlo simulations. In addition to these results, I had the opportunity to collaborate with experimentalists and other theoreticians, leading to an article in Nature Communication.



PROJECT ACTIVITY

Year	Project
	none

PATENTS

Patent
none

CONGRESSES AND SEMINARS

Date	Title	Place
Aug. 2018	European Conference on Surface Science (talk)	Aarhus, Denmark
May 2018	International Nanoalloys Meeting (talk)	Orléans, France
Oct. 2017	Nanoalloys workshop (talk)	Orléans, France
Jun. 2017	Phase diagram modeling workshop (talk)	Paris, France
Oct. 2016	Multiscale Materials Modeling (poster)	Dijon, France
Aug. 2016	Paris International School on Advanced Computational Materials (poster)	Paris, France
Aug. 2016	Condensed matter days (talk)	Bordeaux, France
Jun. 2016	Gold nanoparticles summer school (poster)	Cap d'Agde, France
Jan. 2016	Surfaces Interfaces days (poster)	Marseille, France

PUBLICATIONS

Books
none

Articles in reviews

J. Pirart, [A. Front](#), D. Rapetti, C. Andreazza, P. Andreazza, C. Mottet, and R. Ferrando, Reversed size-dependent stabilization of ordered nanophases, *Nature Comm.* **10**, 1982 (2019).

[A. Front](#), B. Legrand, G. Tréglia, and C. Mottet, Bidimensional phases Co-Pt surface alloys: A theoretical study of ordering and surface segregation, *Surf. Sci.* **679**, 128 (2019).

B. Zhu, [A. Front](#), H. Guesmi, J. Creuze, B. Legrand, and C. Mottet, Magic compositions in Pd-Au nanoalloys, *Comput. Theoret. Chem.* **1017**, 49 (2017).



Congress proceedings
none

OTHER INFORMATION

Teaching activities, 200 h
Solid mechanics, spring 2018 <i>Second year undergraduate physics students, 14 h tutorials, 18 h practical works</i>
Physics for life sciences students, spring 2017-2018 <i>First year undergraduate life sciences students, 30 h tutorials</i>
Electrokinetics, spring 2017 <i>First year undergraduate physics students, 14 h tutorials, 6 h practical works</i>
Statistical physics, spring 2016-2018 <i>Third year undergraduate physics students, 30 h practical works</i>
Statistical physics, spring 2016 <i>Third year undergraduate physics students, 30 h tutorials</i>
Training during Ph.D.
HTML, sept. 2017
Density Functional Theory: from concepts to application, course given in my lab, Marseille, France, May 2017
Python, online course by INRIA (French National Institute for Research in Computer Science), dec. 2016
Didactics of sciences, Marseille, winter 2015

Declarations given in the present curriculum must be considered released according to art. 46 and 47 of DPR n. 445/2000.

The present curriculum does not contain confidential and legal information according to art. 4, paragraph 1, points d) and e) of D.Lgs. 30.06.2003 n. 196.

Place and date: Notre Dame de Riez, 01/09/2019

SIGNATURE