FÖRSTER Georg Daniel

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Postdoc
Institut Pasteur, Structural bioinformatics
born May 7, 1987 in Öhringen (Germany)

Research

since Jan. 2021 **Postdoctoral position**, *Structure of intrinsically disordered proteins from NMR data*, Institut Pasteur, Structural bioinformatics.
Adviser: Dr. Thérèse Malliavin

2019–2020 (19 months) **Postdoctoral position**, *Growth mechanisms of single-walled carbon nanotubes, chiral selectivity* `hrtem-analysis.fr`, Aix Marseille Université, Centre Interdisciplinaire de Nanoscience de Marseille (CINaM), Theory and numerical simulation.
Adviser: Dr. Christophe Bichara

2018–2019 (14 months) **Postdoctoral position**, *Parametrization of a tight binding model for magnetic materials*, CNRS - ONERA, Laboratoire d'étude des microstructures - UMR 104.
Adviser: Dr. Hakim Amara

2016–2018 (2 years) **Postdoctoral position**, *Double pulses for laser ablation studied by molecular dynamics*, University of Montreal, Physics department.
Adviser: Prof. Laurent Lewis

2012–2015 (3 years) **PhD thesis**, *Atomistic modeling of metallic nanoparticles on carbonaceous substrates and epitaxial graphene on metals*, University Claude Bernard Lyon 1, Institut Lumière Matière (ILM).
Advisers: Dr. Florent Calvo and Dr. Franck Rabilloud
starting date: October 1, 2012, defense : September 30, 2015
Thesis committee:
Prof. David RODNEY (ILM Lyon) *president*
Dr. Magali BENOIT (CEMES-CNRS Toulouse) *rapportrice*
Dr. Johann CORAUX (Institut Néel Grenoble) *rapporteur*
Dr. Christophe BICHARA (CINaM Marseille)
Dr. Marie-Laure BOCQUET (ENS Paris)
Dr. Florent CALVO (LiPhy Grenoble)

Education

2010–2012 **Master**, *École normale supérieure (ENS) de Lyon*, Ampère Scholarship of Excellence, with honors (mention : bien).
Fundamental physics

2009–2010 **Bachelor**, *ENS de Lyon*, fairly good (mention : assez bien).
Fundamental physics

2007–2009 **Vordiplom**, *Karlsruhe Institute of Technology*.
Physics

Teaching

Tutoring at the University Claude Bernard Lyon 1 (192 hours including 180 hours in front of students)

2012-2015 **Physics for life and earth sciences**, *bachelor*, problem classes (60 hours) and lab work (84 hours).

2012-2013 semester 2 **Sciences of the Universe and Astrophysics**, *bachelor*, problem classes, (6 hours).

2012-2013 semester 2 **German**, *bachelor*, Course and pedagogical responsibility, (30 hours), Franco-German University Prize.

Supervised internships

July/August 2013 (2 months) **Co-supervision (50%) of Gerrit Brehm's bachelor internship**, *Vibrational spectra of gold aggregates modeled in EAM*.

February 2013 (1 week) **Supervision (100%) of an internship for high school students organized by the association "Science Académie"**, *Numerical simulation of the motion of the earth*.

Trainings

April 2014 **Cargèse International School: Frontier Research in Graphene-based Systems**, *2 weeks*.

November 2013 **Molecular dynamics with LAMMPS**, *Training and mini-project during 2 weeks*.

2012-2013 **Welcoming a young person to your lab**, *Training program of the doctoral school, 37 hours*.

Skills

scientific Global optimization, Monte-Carlo simulations, molecular dynamics, deep learning, carbon nanomaterials, metallic nanoparticles, atomistic modeling: empirical models and tight binding

informatics Linux, Fortran, C/C++, MPI, OpenMP, Python, Bash, Latex, LAMMPS, Gnuplot, Inkscape development of simulation codes

linguistic French (teachings, thesis defense, seminars), English (conference presentations, scientific publications and thesis manuscript), German (native)

Publications

[1] G. D. Förster, T. D. Swinburne, H. Jiang, E. Kauppinen, and C. Bichara, "A semi-grand canonical kinetic monte carlo study of single-walled carbon nanotubes growth," submitted to J. Appl. Phys., arXiv preprint .

[2] W. Liu, Y. Magnin, G. D. Förster, J. Bourgon, T. Len, F. Morfin, L. Piccolo, H. Amara, and C. Zlotea, "Size-dependent hydrogen trapping in palladium nanoparticles," submitted to J. Mater. Chem. C .

[3] G. D. Förster, A. Castan, A. Loiseau, J. Nelayah, D. Alloyeau, F. Fossard, C. Bichara, and H. Amara, "A deep learning approach for determining the chiral indices of carbon nanotubes from high-resolution transmission electron microscopy images," Carbon **169**, 465 (2020).

[4] G. D. Förster and F. Calvo, "Influence of oxidizing conditions on the condensation of aluminum oxide nanoparticles: Insights from atomistic modeling," Appl. Surf. Sci. **512**, 145440 (2020).

[5] A. Artaud, E. Mazaleyrat, G. D. Förster, C. Tonnoir, B. Gilles, P. David, V. Guisset, L. Magaud, F. Calvo, C. Chapelier, and J. Coraux, "Depressions by stacking faults in nanorippled graphene on metals," 2D Mater. **7**, 025016 (2020).

[6] G. D. Förster, M. Benoit, and J. Lam, "Alloy, janus and core-shell nanoparticles: numerical modeling of their nucleation and growth in physical synthesis," Phys. Chem. Chem. Phys. **21**, 22774 (2019).

[7] G. D. Förster and L. J. Lewis, "Numerical study of double-pulse laser ablation in Al," Phys. Rev. B **97**, 224301 (2018).

[8] L. Harbour, G. D. Förster, M. W. C. Dharma-wardana, and L. J. Lewis, "Ion-ion dynamic structure factor, accoustic modes and equation of state of two-temperature warm dense aluminum," Phys. Rev. E **97**, 043210 (2018).

[9] L. Lavisse, M. Girault, P. Berger, J.-M. Jouvard, J.-L. L. Garrec, E. Carvou, F.-X. Ouf, F. Calvo, J. Yu, G.-D. Förster, V. Potin, S. Bourgeois, M. C. M. de Lucas, and J. B. A. Mitchell, "Evolution of the composition of nanoparticles formed by the nanosecond Nd:YAG laser irradiation of an aluminium target in N_2–O_2 gas mixtures," Appl. Phys. A **123**, 692 (2017).

[10] G. D. Förster, M. Girault, J. Menneveux, L. Lavisse, J.-M. Jouvard, F.-X. Ouf, M. Kerkar, J.-L. L. Garrec, E. Carvou, S. Carles, F. Rabilloud, F. Calvo, J. Yu, and J. B. Mitchell, "Oxidation-induced surface roughening of aluminum nanoparticles formed in an ablation plume," Phys. Rev. Lett. **115**, 246101 (2015).

[11] G. D. Förster, F. Rabilloud, and F. Calvo, "Atomistic modeling of epitaxial graphene on Ru(0001) and deposited ruthenium nanoparticles," Phys. Rev. B **92**, 165425 (2015).

[12] G. D. Förster, F. Rabilloud, and F. Calvo, "Adsorption of metal nanoparticles on carbon substrates and epitaxial graphene: Assessing models for dispersion forces," Phys. Rev. B **91**, 245433 (2015).

[13] S. Linas, Y. Magnin, B. Poinsot, O. Boisron, G. D. Förster, V. Martinez, R. Fulcrand, F. Tournus, V. Dupuis, F. Rabilloud, L. Bardotti, Z. Han, D. Kalita, V. Bouchiat, and F. Calvo, "Interplay between Raman shift and thermal expansion in graphene: Temperature-dependent measurements and analysis of substrate corrections," Phys. Rev. B **91**, 075426 (2015).

[14] Y. Magnin, G. D. Förster, F. Rabilloud, F. Calvo, A. Zappelli, and C. Bichara, "Thermal expansion of free-standing graphene: Benchmarking semi-empirical potentials," J. Phys. Condens. Matter **26**, 185401 (2014).

[15] G. D. Förster, Y. Magnin, F. Rabilloud, and F. Calvo, "Effective embedded-atom potential for metallic adsorbates on crystalline surfaces," Model. Simul. Mater. Sci. Eng. **22**, 035015 (2014).

Conferences and seminars

Oral contributions at conferences

November 2020 **Société Francophone d'Étude des Carbones, la rencontre en ligne Carb-ON.fr**, *Structure determination of carbon nanotubes by deep learning*.

November 2018 **Ab initio Description of Iron and Steel (ADIS 2018): Thermodynamics, Kinetics and Defects**, *Tight-binding model for iron including magnetism via the Stoner description*.

October 2018 **GDR Modélisation des Matériaux (ModMat, CNRS 3532) Réunion plénière Paris**, *Tight-binding model for magnetic materials such as Co and Fe*.

May 2017 **Canadian Association of Physicists Congress**, *Ultra-short double pulse laser ablation: basic mechanisms and nanoparticle formation*.

July 2015 **Cecam workshop Toulouse**, *Metallic nanoparticles deposited on extended graphitic substrates: Coarse-graining approach for dispersion forces*, (conférence invitée).

January 2015 **GDR Modélisation des Matériaux (ModMat, CNRS 3532) Réunion plénière Lyon**, *Nanoparticules de platine sur substrats graphitiques et rôle des forces de dispersion*.

Posters

October 2019 **Graphene & Co Annual Meeting 2019**, *Classification of HRTEM images of carbon nanotubes using a deep learning approach*.

June 2016 **Regroupement Québécois sur les Matériaux de Pointe (RQMP) : Grande conférence sur les matériaux de pointe**, *Towards an atomistic modelfor graphene – transition metal contacts*.

April 2014 **Cargèse International School: Frontier Research in Graphene-based Systems**, *Modeling of ruthenium nanoclusters deposited on graphene epitaxied on ruthenium(0001)*.

September 2013 **7th International Conference on Theory of Atomic & Molecular Clusters (TAMC VII), Birmingham**, *Towards the modeling of the self-assembly of metal clusters on graphene epitaxied on metals*.

Seminars

February 2020 **Centre Interdisciplinaire de Nanoscience de Marseille (CINaM)**, *Apprentissage statistique pour la determination de l'indice chiral des nanotubes de carbone dans les images HRTEM*.

November 2019 **Interfaces, Confinement, Matériaux et Nanostructures (ICMN)**, *Classification d'images HRTEM de nanotubes de carbone en utilisant une approche de machine learning*.

November 2018 **Ocean University of China**, *Simulation of laser ablation: effect of double pulses and condensation of AlO nanoparticles*.

October 2018 **Shanghai Jiao Tong University**, *Simulation of the effect of ultra-short double pulses on the laser ablation process*.

October 2018 **Interfaces, Confinement, Matériaux et Nanostructures (ICMN)**, *Simulations des sytèmes nanométriques : modèles, structure et dynamique*.

January 2018 **Université de Montréal**, *Etude numérique de l'ablation laser à double impulsion*.

November 2016 **Université de Montréal**, *Modélisation atomistique de nanoparticules métalliques sur substrats carbonés et graphène épitaxié sur métaux*.

January 2016 **Centre Interdisciplinaire de Nanoscience de Marseille (CINaM)**, *Towards a parametrization of the TB-FMA model for ruthenium and rhodium*.

September 2015 **Laboratoire Interdisciplinaire de Physique (LIPhy)**, *Atomistic modeling of metallic nanoparticles on carbonaceous substrates and epitaxial graphene on metals*.

December 2014 **Centre Interdisciplinaire de Nanoscience de Marseille (CINaM)**, *Nanoparticules métalliques sur substrats carbonés - approches atomistiques avec traitement de la dispersion*.

July 2012 **Laboratoire de spectrométrie ionique et moléculaire (LASIM)**, *Modeling of the structure and dynamics of nanoparticles on metal substrates*.