

Fabien VIALLA

Doctor of Université Pierre et Marie Curie (Paris, France)
Experimental physicist at Laboratoire Pierre Aigrain (Paris, France)
Former student in École Normale Supérieure de Cachan

French citizenship
Born in 14th April, 1986 in Firminy (FRANCE)

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Education

- 2010-2014** **PhD thesis**
Interaction between Carbon Nanotubes and their Physicochemical Environment: towards the Control of the Optical Properties
Supervised by Christophe Voisin
Laboratoire Pierre Aigrain – École Normale Supérieure, Paris, FRANCE
- 2010** **Master 2** in Condensed matter and nanoobjects physics
École Normale Supérieure de Cachan, FRANCE
- 2009** **Agrégation** in physics
French highest diploma for teaching in High School
- 2008** **Master 1** in Fundamental physics
École Normale Supérieure, Paris, FRANCE
- 2007** **License 3** in Fundamental physics
École Normale Supérieure, Paris, FRANCE
- 2004 – 2006** **Classes préparatoires** – Maths and Physics
undergraduate courses preparing for entry exam to top french universities
lycée Claude Fauriel, Saint Étienne, FRANCE
- 2004** **Baccalauréat**, French High School diploma
lycée Jacob Holtzer, Firminy, FRANCE

Publications

F. Vialla, Y. Chassagneux, R. Ferreira, C. Roquelet, J.-S. Lauret, C. Diederichs, G. Cassabois, Ph. Roussignol, C. Voisin, *Unifying low temperature photoluminescence spectra of carbon nanotubes: the role of acoustic phonon confinement, submitted in PRL*

L. Darchy, N. Hanifi, F. Vialla, C. Voisin, P.-A. Bayle, L. Genovese, C. Celle, J.-P. Simonato, A. Filoromo, V. Derycke, P. Chenevier, *A highly selective non-radical diazo coupling provides low cost semi-conducting carbon nanotubes*, **Carbon 66, pp 246 - 258 (2014)**

F. Vialla, C. Roquelet, B. Langlois, G. Delport, S. M. Santos, E. Deleporte, Ph. Roussignol, C. Delalande, C. Voisin, J.-S. Lauret, *Chirality Dependence of the Absorption Cross-Section of Carbon Nanotubes*, **Phys. Rev. Lett. 111, 137402 (2013)**

G. Clavé, G. Delport, C. Roquelet, J.-S. Lauret, E. Deleporte, F. Vialla, B. Langlois, R. Parret, C. Voisin, Ph. Roussignol, B. Jousselme, A. Gloter, O. Stephan, A. Filoramo, V. Derycke, S. Campidelli, *Functionalization of Carbon Nanotubes through Polymerization in Micelles: a Bridge between the Covalent and Non-covalent Methods*, **Chem. Mater.** **25** (13), pp 2700–2707 (2013)

C. Roquelet, B. Langlois, F. Vialla, D. Garrot, J.-S. Lauret, C. Voisin, *Light Harvesting with Non Covalent Carbon Nanotube / Porphyrin Compounds*, **Chem. Phys.** **413**, pp 45-54 (2013)

C. Roquelet, F. Vialla, C. Diederichs, Ph. Roussignol, C. Delalande, E. Deleporte, J.-S. Lauret, C. Voisin, *Local Field Effects in the Energy Transfer Between a Chromophore and a Carbon Nanotube : a Single Nano-Compound Investigation*, **ACS Nano** **6** (10), pp 8796–8802 (2012)

A. C. Betz, F. Vialla, D. Brunel, C. Voisin, M. Picher, A. Cavanna, A. Madouri, G. Fève, J.-M. Berroir, B. Plaçais, and E. Pallecchi, *Hot Electron Cooling by Acoustic Phonons in Graphene*, **Phys. Rev. Lett.** **109**, 056805 (2012)

L. Colombier, J. Selles, E. Rousseau, J.-S. Lauret, F. Vialla, C. Voisin, G. Cassabois, *Detection of a Biexciton in Semiconducting Carbon Nanotubes Using Nonlinear Optical Spectroscopy*, **Phys. Rev. Lett.** **109**, 197402 (2012)

PhD summary

My PhD thesis deals with the experimental study of the optoelectronic properties of carbon nanotubes, using optical spectroscopies (Absorption, Photoluminescence, Raman) including measurements at low temperature (Helium) and at the single object scale. Intrinsic nanotube features have been studied such as the evolution of the absorption cross section depending on the chiral species and the dephasing in low temperature luminescence induced by a coupling of the exciton to the low energy acoustic phonons. Physical chemistry of nanotube/dye molecules hybrid compounds have been investigated leading to the evaluation of the non-covalent binding energies and the efficiency of an internal energy transfer. In addition, Raman spectroscopy have been used to characterize contacted graphene devices and to probe the local phonons temperature in operating systems, bringing evidence of hot electrons cooling.

Scientific skills

Experiments Photoluminescence and Raman spectroscopies of single objects, Vacuum and cryogenics (Helium), Nanotubes aqueous suspension preparation, Nanotubes non-covalent functionalization, SEM and lithography, AFM

Software Matlab, POVray

Conferences

March 2014	28th IWEPNM (Kirchberg in Tirol, AUSTRIA) Poster : <i>Unifying the low temperature photoluminescence spectra of carbon nanotubes - Best Poster Award</i>
April 2013	GDR-I Graphene NanoTube 2013 (Lorient, FRANCE) Invited Talk : <i>Tuning the electron-phonon coupling through nano-confinement of the vibration : a photoluminescence study</i>
August 2012	13 ^{ièmes} Journées de la Matière Condensée (JMC13) (Montpellier, FRANCE) Talk : <i>Local Field Effects in the Energy Transfer Between a Chromophore and a Carbon Nanotube</i>
June 2012	École résidentielle Nanosciences IdF 2012 (Domaine du Tremblay, FRANCE) Poster : <i>Local field effects in the energy transfer between a chromophore and a carbon nanotube : a single molecule investigation</i>
February 2011	GDR-I Graphène NanoTube 2011 (Dourdan, FRANCE) Poster : <i>Single Molecule Photoluminescence Spectroscopy of a Non-Covalent Carbon Nanotube / Porphyrin Complex</i>

Experiences

2011 – 2013	Teaching at Université Pierre et Marie Curie (UPMC), Paris LP104 : Introduction to physics (License1) Development of experiments with an infrared thermal camera
February – June 2010	Internship in Laboratoire Pierre Aigrain, Paris, FRANCE <i>Optical Spectroscopies on graphene and carbon nanotubes at the single molecule scale</i> Supervised by Christophe Voisin
February – July 2008	Internship in Walter Schottky Institut, Garching, GERMANY <i>Electrical characterization of Si doped GaAs nanowires</i> Supervised by Anna Fontcuberta i Morral
July – August 2007	Internship in Laboratoire DIOM, Saint Étienne, FRANCE <i>Temperature study of the Faraday rotation induced in magnetic nanoparticles doped metallic oxydes thin films</i> Supervised by Francois Royer

Languages

- **French**, native
- **Anglais**, fluent
- **Spanish**, rudiment