

Juliana M. Morbec

1. CONTACT

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2. PROFESSIONAL EMPLOYMENT

- *Professor of Physics*
August 2009 - Present
University of Alfenas (Universidade Federal de Alfenas, Brazil)

3. EDUCATION

- *Ph.D. in Physics*
April 2006 - March 2009
Physics Institute of São Carlos, University of São Paulo, Brazil
Thesis topic: *Orbital magnetism in many-electrons system*
Advisor: Prof. Klaus Capelle
- *M.S. in Physics*
March 2004 - February 2006
University of Uberlândia, Brazil
Topic: *Ge adsorption on SiC(0001): an ab initio study*
Advisor: Prof. Roberto Hiroki Miwa
- *B.S. in Mathematics*
January 2002 - December 2005
University of Uberlândia, Brazil
- *B.S. in Physics*
January 2001 - August 2003
University of Uberlândia, Brazil
Emphasis in High School Teaching

4. PUBLICATIONS

- 1) “*Exact and approximate relations for the spin-dependence of the exchange energy in high magnetic fields*”, J. M. Morbec and K. Capelle, Int. J. Mod. Phys. B **23**, 3004 (2009).

- 2) “*Contribution of the second Landau level to the exchange energy of the three-dimensional electron liquid in a high magnetic field*”
J. M. Morbec and K. Capelle, Phys. Rev. B **78**, 085107 (2008).
- 3) “*Orbital-polarization terms: from a phenomenological to a first-principles description of orbital magnetism in density-functional theory*”
J. M. Morbec and K. Capelle, Int. J. Quantum Chem. **108**, 2433-2441 (2008)
(also available in arXiv:0712.2350).
- 4) “*Ge adsorption on SiC(0001): An ab initio study*”
J. M. Morbec and R. H. Miwa, Surf. Sci. **600**, 1107-1112 (2006).

5. RESEARCH INTERESTS

- Density-functional theory
- Current-density-functional theory
- Magnetic properties of matter
- Electronic-structure calculations
- Nanowires, nanotubes, surfaces and interfaces

6. PARTICIPATION IN CONFERENCES

- **XXXII Brazilian Meeting on Condensed Matter Physics**, Águas de Lindóia, Brazil, 2009.
Oral Communication: *Exchange and correlation energies of the three-dimensional interacting electron gas in a magnetic field*, J. M. Morbec, K. Capelle and G. Vignale.
- **Workshop DFT 2008**, São Carlos, Brazil, 2008.
Poster: *Exchange energy of the three-dimensional electron liquid in a strong magnetic field*, J. M. Morbec, K. Capelle and G. Vignale.
Poster: *Orbital-polarization terms: from a phenomenological to a first-principles description of orbital magnetism in density-functional theory*, J. M. Morbec and K. Capelle.
Poster: *Carbon clusters in Silicon Carbide Nanowires: an ab initio study*, J. M. Morbec and R. H. Miwa.
- **18th International Conference on High Magnetic Fields in Semiconductor Physics and Nanotechnology**, São Pedro, Brazil, 2008.
Poster: *Exchange energy of the three dimensional electron liquid in a very strong magnetic field*, J. M. Morbec and K. Capelle.
- **XI Escola Brasileira de Estrutura Eletrônica (XI Brazilian School on Electronic Structure)**, Uberlândia, Brazil, 2008.

Poster: *C clusters in silicon carbide nanowires: an ab initio study*, J. M. Morbec and R. H. Miwa.

Poster: *Orbital-polarization terms: from a phenomenological to a first-principles description of orbital magnetism in density-functional theory*, J. M. Morbec and K. Capelle.

- **II Encontro Anual da Rede Theo-Nano** (II Annual Meeting of Theo-Nano Network), São Paulo, Brazil, 2007.
Oral Communication: *Funcionais para altos campos magnéticos*, J. M. Morbec and K. Capelle.

- **XIV Simpósio Brasileiro de Química Teórica** (XIV Brazilian Symposium on Theoretical Chemistry), Poços de Caldas, Brazil, 2007.
Poster: *Brooks term: link between ad hoc and ab initio treatments of orbital magnetism within density functional theory*, J. M. Morbec and K. Capelle.

- **VI Escola Brasileira de Magnetismo** (VI Brazilian School on Magnetism), Niterói, Brazil, 2007.
Poster: *Model dielectric functions of electron liquids in the presence of strong magnetic fields*, J. M. Morbec and K. Capelle.

- **Workshop on Advances in Physics and Applications of Low-Dimensional Systems**, International Center for Condensed Matter Physics, Brasília, Brazil, 2007.
Poster: *Construction of model dielectric functions from density functionals*, J. M. Morbec and K. Capelle.

- **XXX Encontro Nacional de Física da Matéria Condensada** (XXX Brazilian Meeting on Condensed Matter Physics), São Lourenço, Brazil, 2007.
Poster: *New approaches to orbital magnetism within density functional theory*, J. M. Morbec and K. Capelle.

- **2nd International Symposium on Advanced Materials and Nanostructures**, São Carlos, Brazil, 2007.
Poster: *Carbon Clusters in Silicon Carbide Nanowires: an ab initio study*, J. M. Morbec and R. H. Miwa.

- **X Escola Brasileira de Estrutura Eletrônica** (X Brazilian School on Electronic Structure), Niterói, Brazil, 2006.
Poster: *Novas abordagens computacionais no tratamento de magnetismo orbital em sistemas de muitos elétrons*, J. M. Morbec and K. Capelle.

- **12th Brazilian Workshop on Semiconductor Physics**, São José dos Campos, Brazil, 2005.
Poster: *Ge adsorption on SiC(0001): an ab initio study*, J. M. Morbec and R. H.

Miwa.

- **IX Escola Brasileira de Estrutura Eletrônica** (IX Brazilian School on Electronic Structure), Salvador, Brazil, 2004.
Poster: *Estudo da estrutura 6H-SiC(0001) com adsorção de Si e Ge*, J. M. Morbec and R. H. Miwa.
- **VIII Escola Brasileira de Estrutura Eletrônica** (VIII Brazilian School on Electronic Structure), Juiz de Fora, Brazil, 2002.
Poster: *Adsorção de enxofre sobre a estrutura InAs(111)A-2×2*, J. M. Morbec and R. H. Miwa.

7. HONOURS

- Honorary mention for the poster “*Exchange energy of the three-dimensional electron liquid in a strong magnetic field*”, at the Workshop DFT 2008, São Carlos, Brazil, 2008.

8. ADDITIONAL INFORMATION

- Scientific collaboration with Prof. Klaus Capelle (Instituto de Física de São Carlos, Universidade de São Paulo, Brazil).
Subject: Three-dimensional electron gas in high magnetic fields.
- Scientific collaboration with Prof. Giovanni Vignale (University of Missouri-Columbia, USA).
Subject: *Exchange and correlation energies of a three-dimensional gas in the presence of a magnetic field.*
- Scientific collaboration with Prof. R. H. Miwa (Universidade Federal de Uberlândia, Brazil).
Subject: *Carbon clusters in SiC nanowires.*
- Visiting student at Dept. of Physics and Astronomy, University of Missouri-Columbia, USA.
From April 5th to June 20th, 2008.
Subject: *Exchange and correlation energies of a three-dimensional electron gas in the presence of a magnetic field.*
Supervisor: Prof. Giovanni Vignale.
- Undergraduate research work in Physics, University of Uberlândia, Brazil.
From 2001 to 2002.
Topic: *Study of structural and electronic properties of the adsorption of metallic elements in Si(111) and Ge (111) surfaces.*
Advisor: Prof. Roberto Hiroki Miwa