

CURRICULUM VITAE
María de las Mercedes Calbi

Contact Information:

Department of Physics
Southern Illinois University
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Professional Experience:

09/2003 to present Assistant Professor, Department of Physics, Southern Illinois University
08/2000 to 08/2003 PostDoctoral Fellow, The Pennsylvania State University
03/1994 to 03/2000 Teaching Assistant, University of Buenos Aires, Argentina

Education and Training:

The Pennsylvania State University - PostDoctoral fellow - 08/2000-08/2003
Advisor: Prof. Milton W. Cole
University of Buenos Aires, Argentina - Ph. D. in Physics - March 2000
Advisor: Prof. Susana E. Hernández
University of Buenos Aires, Argentina - B.S. in Physics - March 1995

Research Awards:

- Recipient of a PostDoctoral fellowship, CONICET, Argentina, 2000.
- Recipient of a PostDoctoral fellowship, Fundación Antorchas, Argentina, 2000.
- Recipient of a Doctoral fellowship, CONICET, Argentina, 1995.

Research Grants:

- National Science Foundation, Chemical and Biological Separations (CBET), “CAREER: Kinetics of Adsorption in Nanoporous Structures”, 07/01/08 – 06/30/13, \$ 400,000
- National Science Foundation, Division of Materials Research, “Polyatomic Adsorbates on Carbon Nanotube Bundles”, 07/01/07 – 06/30/10, \$ 330,000
- Petroleum Research Fund, Type G Starter Grant, “Dynamics and Kinetics of Gases on Nanotube Bundles”, 09/01/2005 – 08/31/2007, \$ 35,000
- Office of Research Development & Administration, SIUC, Faculty Seed Grant, 05/15/05-05/15/06.

Research Interests:

- Gas adsorption on nanostructures, Equilibrium and Dynamics: Thermodynamics of adsorbed phases and phase transitions; kinetics of adsorption and diffusive behavior; porous materials for separation, sensor and environmental applications.
- Forces between nanosized particles, aggregation phenomena in fluids.

Scientific Publications – Journal Articles:

Vaiva Krungleviciute, M. Mercedes Calbi, Jeff Wagner, Aldo D. Migone, Masako Yudasaka and Sumio Iijima, “*Probing the structure of carbon nanohorn aggregates by adsorbing gases of different size*”, submitted for publication (2007).

Jared T. Burde, Seyoum Tsige, and M. Mercedes Calbi, “*Removing weak adsorbents by kinetic selectivity in carbon nanotube bundles*”, in preparation.

Jared T. Burde, Chong Park, Nayeli Zuniga, and M. Mercedes Calbi, “*Kinetics of gas adsorption on external surfaces of carbon nanotube bundles*”, in preparation.

1. Jared T. Burde and M. Mercedes Calbi, “*Physisorption Kinetics in Carbon Nanotube Bundles*”, J. Phys. Chem. C 111, 5057-5063 (2007).
2. Dinesh S. Rawat, M. Mercedes Calbi, Aldo D. Migone, “*Equilibration Time: Kinetics of Gas Adsorption on Closed and Open-ended Single Walled Carbon Nanotubes*”, J. Phys. Chem. C. 111, 12980-12986 (2007).
3. Luke Heroux, Vaiva Krungleviciute, M. Mercedes Calbi, and Aldo D. Migone, “*CF₄ on carbon nanotubes: Physisorption on grooves and external surfaces*”, J. Phys. Chem B 110, 12597-12602 (2006).
4. M. Mercedes Calbi and J. L. Riccardo, “*Energy barriers at the ends of carbon nanotube bundles: Effects on interstitial adsorption kinetics*”, Phys. Rev. Lett. 94, 246103 1-4 (2005).
5. Y.H. Kahng, R.B. Hallock, M.M. Calbi, “*Competitive adsorption of He-3 and He-4 to carbon nanotube bundles*”, J. Low Temp. Phys. 138, 217-222 (2005).
6. M. Mercedes Calbi, Ari Mizel and Milton W. Cole, “*Lattice dilation near a single hydrogen molecule in an interstitial channel within a nanotube bundle*”, Phys. Rev. B 69, 195408 (2004).
7. R.A. Trasca, M.M. Calbi, M.W. Cole, J.L. Riccardo, “*Lattice-gas Monte Carlo study of adsorption in pores*”, Phys. Rev. E 69, 011605 (2004).
8. Francesco Ancilotto, M. Mercedes Calbi, Silvina M. Gatica and Milton W. Cole, “*Bose-Einstein Condensation of Molecular Hydrogen in Nanotube Bundles*”, Phys. Rev. B 70, 165422 (2004).
9. Francesco Ancilotto, M. Mercedes Calbi, Milton W. Cole, Silvina M. Gatica and E. S. Hernandez, “*Intriguing examples of inhomogeneous broadening*”, Israel J. Chem. 44, 229 (2004).
10. Silvina M. Gatica, M. Mercedes Calbi and Milton W. Cole, “*Universal anisotropic condensation transition of gases in nanotube bundles*”, Journal of Low Temperature Physics 133, 399-406 (2003).
11. S.M. Gatica, M.M. Calbi, D. Velegol and M.W. Cole, “*Three-body interactions involving clusters and films*”, Phys. Rev. B 68, 205409 (2003).
12. M.K. Kostov, M.M. Calbi and M.W. Cole, “*Phonons and specific heat of phases adsorbed on the surface of nanotube bundles*”, Phys. Rev. B 68, 245403 (2003).
13. M.M. Calbi, S.M. Gatica and M.W. Cole, “*Statistical mechanics of interacting peapods*”, Phys. Rev. B 67, 205417 (2003).
14. M.M. Calbi, S.M. Gatica, D. Velegol, M.W. Cole, “*Retarded and non retarded van der Waals interactions between a cluster and a second cluster or a conducting surface*”, Phys. Rev. A 67, 033201 (2003).
15. M. Mercedes Calbi and Milton W. Cole, “*Dimensional crossover and quantum effects of gases adsorbed on nanotube bundles*”, Phys. Rev. B 66, 115413-1-11 (2002).

16. M. Mercedes Calbi, Silvina M. Gatica, Mary J. Bojan, Milton W. Cole, “*Ground state and thermal properties of a lattice gas on a cylindrical surface*”, Phys. Rev. E 66, 061107 (2002).
17. S. M. Gatica, M.M. Calbi and M.W. Cole, “*Simple model of capillary condensation in porous media*”, Phys. Rev. E 65, 061605 (2002).
18. Raluca A. Trasca, M. Mercedes Calbi and Milton W. Cole, “*Lattice model of gas condensation within nanopores*”, Phys. Rev. E 65, 061607 (2002).
19. M.M. Calbi, F. Toigo, and M.W. Cole, “*Dilation and intercalation of gases within carbon nanostructures*”, J. Low Temp. Phys. 126, 179 (2002).
20. M.M. Calbi, F. Toigo, M.W. Cole, “*Dilation-induced phases of gases absorbed within a bundle of carbon nanotubes*”, Phys. Rev. Lett. 86, 5062-5065 (2001).
21. M.M. Calbi , M.W. Cole , S.M. Gatica , M.J. Bojan , and G. Stan, “*Colloquium: Condensed phases of gases inside nanotube bundles*”, Rev. Mod. Phys. 73, 857-865 (2001).
22. M.M. Calbi , S.M. Gatica, M.J. Bojan, and M.W. Cole, “*Phases of neon, xenon, and methane adsorbed on nanotube bundles*”, J. Chem. Phys. 115, 9975-9981 (2001).
23. S.M. Gatica, G. Stan, M.M. Calbi, J.K. Johnson, and M.W. Cole, “*Axial phase of quantum fluids in nanotubes*”, J. Low Temp. Phys. 120, 337-359 (2000).
24. M.M. Calbi and E.S. Hernandez, “*Dynamical response of liquid ³He films adsorbed on solid substrates*”, J. Low Temp. Phys. 120, 1-43 (2000).
25. M.M. Calbi, F. Toigo, S.M. Gatica, and M.W. Cole, “*Capillary condensation for quantum fluids*”, Phys. Rev. B 60, 14935-14942 (1999).
26. S.M. Gatica, M.M. Calbi, M.W. Cole, “*Capillary condensation transitions in a slab geometry*”, Phys. Rev. E 59, 4484-4489 (1999).
27. M.M. Calbi and E.S. Hernandez, “*Fermi disks model for ³He films adsorbed on graphite within a density-functional approach*”, Phys. Rev. B, 13258-13264 (1998).
28. M.M. Calbi, S.M. Gatica, E.S. Hernandez, “*Dynamical susceptibility of a thermally excited neutral Fermi-liquid film*”, Phys. Rev. B 54, 13097-13104 (1996).
29. M.M. Calbi , E.S. Hernandez, “*Exchange effects in a two-dimensional Fermi liquid*”, J. Phys. A-Math. Gen. 29, 5257-5272 (1996).

Scientific Publications – Book Chapter:

M. Mercedes Calbi, M.W. Cole, S.M. Gatica, M.J. Bojan, J.K. Johnson, “*Adsorbed gases in bundles of carbon nanotubes: Theory and Simulation*”, Chapter 16 in Adsorption in Carbons, ed. by Juan M.D. Tascon, Elsevier Science Publishing; to appear in 2008.

Student Advisement:

Jared Burde, undergraduate student.
Chong Park, REU undergraduate student.
Jeffrey Wagner, graduate student.
Nayeli Zuniga, graduate student.
Seyoum Tsige, graduate student.

Synergistic Activities:

- ▶ Physics Workshop Leader, *Expanding Your Horizons in Science & Mathematics*, a conference for 7th, 8th, & 9th grade girls to motivate and encourage young women to pursue science careers; Southern Illinois University, Carbondale, IL.
- ▶ Member of Executive Committee in *the 28th Illinois Junior Science & Humanities Symposium*, a conference and competition aiming at promoting research and experimentation in sciences, mathematics and engineering at the high school level; Southern Illinois University, Carbondale, IL.
- ▶ Undergraduate student advisor, *NSF Research Experience for Undergraduates* in Materials Science, summer 2006.
- ▶ Reviewer of scientific articles (Physical Review Letters, Physical Review B, Journal of Chemical Physics, Surface Science, Journal of Physical Chemistry, Journal of Low Temperature Physics)
- ▶ Grant Proposal Reviewer: Petroleum Research Foundation, Environmental Protection Agency, National Science Foundation, Awwa Research Foundation, British Research Council.

Invited Talks:

- ▶ “*Gas adsorption and kinetics in carbon nanotube bundles*”, March 18th, 2005, Department of Physics, University of Missouri – Kansas City.
- ▶ “*Adsorption kinetics in carbon nanotube bundles*”, June 6th, 2005, Department of Physics, Pennsylvania State University.
- ▶ “*Novel phases of matter adsorbed on nanotube bundles*”, Southern Illinois University (Carbondale), March 2003; Wesleyan University (Middletown,CT), May 2003.
- ▶ “*Gases adsorbed on nanotube bundles: Dimensional crossover and quantum effects*”, Midwest Thermodynamic & Statistical Mechanics Meeting, Pittsburgh, PA, May 2002.
- ▶ “*Dilation and Intercalation of gases within carbon nanostructures*”, Symposium on Quantum Fluids and Solids, Konstanz, Germany, July 2001.
- ▶ “*³He films within a density-functional approach*”, University of Valencia, Valencia, Spain, July 1997.