

Murielle Villeret Hsu, PhD
Department of Neurology
University of Wisconsin Hospital & Clinics
600 Highland Av, H6/584
Madison WI 53792
murielle.hsu@gmail.com

Personal Data

Date of birth: January 4, 1965
Marital status: married
Citizenship: Belgium
Status: Green card holder

Career goal

Prior research in theoretical solid state physics
Current research in computational neuroscience

Experience and education

Senior Scientist, Computational Neuroscience Physical Theory Lab, Department of Neurology,
University of Wisconsin, 2003-present
Adjunct Associate Professor of Physics, Santa Clara University, CA, 2001-2002
Reader (Associate Professor) in Mathematics, City University, London, UK, 1997-2001
Lecturer (Assistant Professor) in Mathematics, City University, London, UK, 1992-1997
Post-doctoral research assistant, City University and Imperial College, London, UK, 1992
Post-doctoral research associate, Purdue University, 1990-1992
NATO Research Fellow, Scuola Normale Superiore, Pisa, Italy, 1990-1991
Graduate student, Purdue University, 1986-1989
PhD in Physics, 1989
Thesis: Magnetic excitations in diluted magnetic semiconductors and their superlattices
Licence en Sciences Physiques, University of Liege, Belgium
with "La plus grande distinction", 1986
Thesis: Electromagnetic generation of acoustic waves in metals

Research

Neural network computer modeling, 2002-present
EEG seizure detection using potential energy surfaces, 2001-present
Metallic magnetic multilayers, theory of electronic and transport properties
Diluted magnetic semiconductors, optical and magnetic properties

Awards and Honors

Nuffield Foundation Science Research Fellow, 1996-1997
One of seven awarded in science and engineering in England
Nuffield Foundation Award to Newly Appointed Science Lecturers, 1993
Edward S. Akeley Prize, Purdue University, 1990-1991
Best thesis in theoretical solid state physics at Purdue University
David Ross Research Fellow, Purdue University, 1988

Membership and other activities

American Physical Society
Belgian Physical Society
European Physical Society

Publications: 47 in refereed journals

Full list available on request

Seminars and invited talks: 24 to date in Europe, US, Japan and South America
Full list available on request

Contributed talks: 48 to date at international conferences
Full list available on request

Grants: 20 grants since 1993 totaling US\$487,000 shared in two research groups
Full list available on request

Teaching:

Physics

Classical mechanics
Electromagnetism
Quantum mechanics
Thermal physics

Mathematics

Algebra
Calculus
Geometry and vectors
Engineering mathematics, basic and advanced
Integral and integro-differential equations
Computational mathematics laboratory
Mathematics for business students

Director and tutor, Socrates exchange program, 1993-2001

Student exchange program between City University (London) and:
Technical University (Berlin)
Humboldt University (Berlin)
University of Klagenfurt (Austria)
University of Cergy-Pontoise (France)

Mathematics Program Tutor, Chief administrator, 1999-2001

Academic advising and pastoral care of undergraduates

Undergraduate thesis advisor, 8 students from 1993-1999

Graduate student advisor: 1 from 1994-1998

Postdoctoral advisor: 1

Administration:

Elected member, Department of Mathematics Advisory Committee
on Promotion & Salary Review, 1993-2001

Elected member, Mathematics School Board, 1999-2001

Elected member, Board of Studies in Mathematics, 1993-1999

Library Liaison Tutor, 1997-1999

Member of Mathematics Course Management Committee, 1999-2001

Convenor, Mathematics Staff/Student Liaison Committee, 1999-2001

PhD Admission Tutor, 2000-2001

Other professional activities:

Member, Engineering and Physical Sciences Research Council, 1998, 1999
(English equivalent of US National Science Foundation)

Interviewing Committee for Advanced Postdoctoral Fellowships

Engineering and Physical Sciences Research Council, Policy Committee,
London, 1998

Second International Symposium on Metallic Multilayers, Publications Committee,
Cambridge, 1995

Languages: fluent in French and English

Publications

1. Electromagnetic generation of acoustic waves in metals, M. Villeret, S. Rodriguez, E. Kartheuser, Phys Rev B 1988;37:2692-4.
2. Antiferromagnetic spin waves in superlattices of diluted magnetic semiconductors, M. Villeret, S. Rodriguez, E. Kartheuser, Appl Phys Lett 1988;53:447-9.
3. Magnetic excitations in semiconductor superlattices, M. Villeret, S. Rodriguez, E. Kartheuser, Phys Rev B 1989;39:2583-2596.
4. Optical absorption spectrum of $\text{CdGa}_2\text{Se}_4\text{:Co}^{2+}$, M. Villeret, Phys Rev B 1989;39:10236-8.
5. Energy level spectra of Co^{2+} and Fe^{2+} in diluted magnetic semiconductors, M. Villeret, S. Rodriguez, E. Kartheuser, Physica B 1990;162:89-114.
6. Energy level spectra of transition metal ions in II-VI semiconductors, M. Villeret, S. Rodriguez, E. Kartheuser, Phys Rev B 1990 (E);42:11375.
7. Energy level spectra of Co^{2+} and Fe^{2+} in diluted magnetic semiconductors, M. Villeret, S. Rodriguez, E. Kartheuser, J Appl Phys 1990;67:4221-4232.
8. Energy level spectra of transition metal ions in diluted magnetic semiconductors, M. Villeret, S. Rodriguez, E. Kartheuser, *Proceedings of the Materials Research Society Symposium on Properties of II-VI Semiconductors: Bulk Crystals, Epitaxial Films, Quantum Well Structures and Dilute Magnetic Systems*, vol 161, eds. F.J. Bartoli Jr., H.F. Schaake, J. Schetzina (Materials Research Society, Pittsburgh PA 1990) pp. 491-495.
9. Magnetic properties of iron-based diluted magnetic semiconductors, M. Villeret, S. Rodriguez, E. Kartheuser, Solid State Commun 1990;75:21-24.
10. Magnetic anisotropy of cubic iron-based diluted magnetic semiconductors, M. Villeret, S. Rodriguez, E. Kartheuser, Phys Rev B 1991;43:3443-3449.
11. Optical absorption and Zeeman effect of Cu^{2+} in tetrahedrally coordinated crystals, M. Villeret, S. Rodriguez, E. Kartheuser, Phys Rev B 1991;43:14115-14123.
12. Magneto-piezospectroscopy of acceptors in tetrahedrally coordinated semiconductors, M. Villeret and S. Rodriguez, Il Nuovo Cimento 1991;13:529-550.
13. Anisotropy of the magnetization of $\text{Cd}_{1-x}\text{Fe}_x\text{Te}$, M. Villeret, S. Rodriguez, E. Kartheuser, A. Camacho, L. Quiroga, Phys Rev B 1991;44:399-402.
14. Magnetic anisotropy of cubic iron-based diluted magnetic semiconductors, M. Villeret, S. Rodriguez, E. Kartheuser, Physica Scripta 1991;39:131-134 (Proceedings of the 11th General Conference of the Condensed Matter Division of the European Physical Society, April 8-11, 1991, Exeter, England).
15. Origin of the forbidden transitions in diluted magnetic semiconductors, M. Villeret, S. Rodriguez, Solid State Commun 1991;80:169-172.
16. Electronic excitations of substitutional transition metal ions in II-VI semiconductors: CdTe:Fe^{2+} and CdSe:Fe^{2+} , M. Udo, M. Villeret, I. Miotkowski, A.J. Mayur, A.K. Ramdas, S. Rodriguez, Phys Rev B 1992;46:7459-7468.

17. Exchange coupling in magnetic multilayers: Effect of partial confinement of carriers, J. Mathon, M. Villeret, D.M. Edwards, *J Phys: Condensed Matter* 1992;4:9873-9892.
18. Anisotropy of the magnetization of isolated Fe^{2+} ions in II-VI compounds, E. Kartheuser, S. Rodriguez, M. Villeret, *Solid State Commun* 1992;84:635-637.
19. Zeeman effect of the energy levels of Fe^{2+} in diluted magnetic semiconductors, M. Villeret, S. Rodriguez, E. Kartheuser, *Phys Rev B* 1993;47:1228-1236.
20. Theory of oscillatory exchange in magnetic multilayers: Effect of partial confinement and band mismatch, J. Mathon, M. Villeret, D.M. Edwards, R.B. Muniz, *J Magn Magn Mat* 1993; 121:242-247.
21. Intraionic transitions in Mn^{2+} in zinc-blende semiconductors, S. Rodriguez, M. Villeret, *Il Nuovo Cimento* 1993;15D:347-353.
22. Recent developments in the theory of oscillatory exchange coupling in magnetic multilayers, D.M. Edwards, J. Mathon, R.B. Muniz, M. Villeret, J.M. Ward, in *Magnetism and Structure in Systems of Reduced Dimension*, ed R.F.C. Farrow, NATO Advanced Research Workshop, Plenum, 1993, pp 401-410.
23. Theory of the systematic variation of the exchange coupling strength in magnetic multilayers, J. Mathon, M. Villeret, D.M. Edwards, *J Magn Magn Mat* 1993;127:L261-6.
24. Van Vleck paramagnetism of chromium and iron-doped II-VI semiconductors, E. Kartheuser, S. Rodriguez, M. Villeret, *Phy Rev B* 1993;48:14127.
25. Effect of hybridization on the exchange coupling in magnetic multilayers, J. Mathon, M. Villeret, M.M. Mander, D.M. Edwards, R.B. Muniz, *Mat Res Soc Symp Proc* 1993;313:171.
26. Quantum well theory of the exchange coupling in magnetic multilayers, J. Mathon, M. Villeret, D.M. Edwards, R.B. Muniz, *Fitz Met Metalloved* 1995;79:9.
27. Excitation spectrum of Fe^{2+} in a tetrahedral potential: Dynamic Jahn-Teller effect, D. Colignon, E. Kartheuser, S. Rodriguez, M. Villeret, *Phys Rev B* 1995;51:4849.
28. Quantum well theory of the exchange coupling in Co/Cu/Co (001), J. Mathon, M. Villeret, R.B. Muniz, J. d'Albuquerque e Castro, D.M. Edwards, *Phys Rev Lett* 1995;74:3696.
29. Spin current and exchange coupling in magnetic multilayers, D.M. Edwards, R.P. Erickson, J. Mathon, R.B. Muniz, M.A. villeret, *Material Sci Eng B* 1995;31:25.
30. Selection rules for oscillations of the interlayer exchange coupling as a function of ferromagnet thickness, J. D'Albuquerque e Castro, J. Mathon, M. villeret, D.M. Edwards, *Phys Rev B* 1995;51:12876.
31. Selection rules for oscillations of the giant magnetoresistance with nonmagnetic spacer layer thickness, J. Mathon, M. Villeret, H. Itoh, *Phys Rev B* 1995;52:R6983.
32. Optical and magnetic properties of Fe^{2+} and Cr^{2+} in II-VI semiconductors: The Jahn-Teller effect, D. Colignon, E. Kartheuser, S. Rodriguez, M. Villeret, *J of Crystal Growth* 1996;159:875-8.
33. Confinement mechanism for strong temperature dependence of the interlayer exchange coupling in Co/Cu (001), J. d'Albuquerque e Castro, J. Mathon, M. Villeret, A. Umerski, *Phys Rev B* 1996;53:R13306-9.

34. Zeeman effect in diluted magnetic semiconductors, S. Rodriguez, E. Kartheuser, M. Villeret, in *High Magnetic Fields in the Physics of Semiconductors II*, eds. G. Landwehr, W. Ossau, World Scientific, Singapore, 1997, pp 825-835.
35. Oscillations with Co and Cu thickness of the current-perpendicular-to-plane giant magnetoresistance of a Co/Cu/Co (001) trilayer, J. Mathon, A. Umerski, M. Villeret, *Phys Rev B* 1997;55:14378.
36. Quantum well theory of the exchange coupling in magnetic multilayers with application to Co/Cu/Co (001), J. Mathon, M. Villeret, A. Umerski, R.B. Muniz, J. d'Albuquerque e Castro, D.M. Edwards, *Phys Rev B* 1997;56:11797-11809.
37. Isotope splitting of the zero-phonon line of Fe²⁺ in cubic III-V semiconductors, D. Colignon, E. Mailleux, E. Kartheuser, S. Rodriguez, M. Villeret, *Solid State Commun* 1998;105:205-9.
38. Calculation of the perpendicular giant magnetoresistance of Co/Cu (001) two-dimensional lateral superlattices, M. Villeret, J. Mathon, R.B. Muniz, J. d'Albuquerque e Castro,
39. Dynamic Jahn-Teller interaction with Gamma₅ phonons in the ground state of Cu²⁺ in cubic II-VI semiconductors, D. Colignon, E. Mailleux, E. Kartheuser, M. Villeret, *Phys Rev B* 1998;57:12932.
40. Quantum oscillations of the spin density in magnetic multilayers, J. Mathon, A. Umerski, M. Villeret, *Phys Rev B* 1999;59:6344.
41. Enhanced magnetoresistance effect in layered systems, M.S. Ferreira, J. d'Albuquerque e Castro, R.B. Muniz, M. Villeret, *Applied Phys Lett* 1999;75:2307.
42. Spin filtering and a new regime of giant magnetoresistance, M.S. Ferreira, J. d'Albuquerque e Castro, R.B. Muniz, M. Villeret, *J Phys: Condens Mat* 2000;12:2833-2846.
43. Effect of electron-phonon interaction in iron-doped III-V cubic semiconductors, d. Colignon, E. Kartheuser, M. Villeret, *J Phys: Condens Mat* 2000;12:2691-2699.
44. Enhanced magnetoresistance and spin filter effects in magnetic heterostructures, M.S. Ferreira, J. d'Albuquerque e Castro, R.B. Muniz, M. Villeret, *J. Phys: Condens Mat* 2000;12:L373-378.
45. Induced magnetization spiral in a nonmagnetic metal sandwiched between two ferromagnets, J. Mathon, A. Umerski, M. Villeret, R.B. Muniz, D.M. Edwards, *J Magn Magn Mat* 2000;217:188.
46. The effect of isotopic composition on the lattice parameter of crystals, S. Rodriguez, E. Kartheuser, M. Villeret, *Quadeirni della Scuola Normale Superiore di Pisa* 2001:369.
47. A piece-wise harmonic Langevin model of EEG dynamics: Theory and application to EEG seizure detection, M. Hsu, D. Hsu, *Neurocomputing* 2005; 65-66:469-474.

References

Professor S. Rodriguez
Department of Physics
Purdue University
West Lafayette IN 47907-1396
USA
Tel: 765-494-3044
Fax: 765-494-0706
Email: srf@physics.purdue.edu

Professor J. Mathon
Department of Mathematics
City University
Northampton Square
London EC1V 0HB
England
Tel: (44) 20-477-8459
Fax: (44) 20-477-8597
Email: j.mathon@city.ac.uk

Professor D.M. Edwards
Department of Mathematics
Imperial College of Science, Technology & Medicine
180 Queen's Gate
London SW7 2BZ
England
Tel: (44) 20-594-8532
Fax: (44) 20-594-8517
Email: dedwards@ma.ic.ac.uk