CURRICULUM VITAE

Ju Hyo Kim

PERSONAL:

Birthdate: March 17, 1963
Citizenship: U.S.A.
(I lived in U.S.A. for 30 years and am fluent in English.)

ADDRESS:

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EDUCATION:

Ph.D. in Physics, (June 1990)
The University of Chicago
Ph.D Thesis: *Fermi liquid description of electronic structure and transport properties of high-T_c systems*
Thesis Advisor: Prof. K. Levin

B.A. in Physics and Chemistry, (June 1985)
Revelle College
University of California, San Diego

PROFESSIONAL EXPERIENCE:

August 2005 to Present:
Professor, Department of Physics
University of North Dakota, Grand Forks, ND 58202-7129, U.S.A.

August 2000 to July 2005:
Associate Professor, Department of Physics
University of North Dakota, Grand Forks, ND 58202-7129, U.S.A.

August 2003 to July 2004: (on developmental leave)
Visiting Professor, Institute of Physics and Applied Physics
Yonsei University, Sudaemoon-ku, Seoul 120-749, Korea

August 1996 to July 2000:
Assistant Professor, Department of Physics
University of North Dakota, Grand Forks, ND 58202-7129, U.S.A.

September 1993 to August 1996:
Research Associate at the National High Magnetic Field Laboratory
Florida State University, Tallahassee, FL 32306-4005, U.S.A.

August 1990 to August 1993:
Packard Postdoctoral Fellow at the Johns Hopkins University
Department of Physics and Astronomy, Baltimore, MD 21218, U.S.A.

October 1992 to November 1992:
Visiting Scientist at the Technion-Israel Institute of Technology
Department of Chemistry and Solid State Institute, Haifa, Israel.

August 1991 to August 1992:
Visiting Scientist at the Max-Planck-Institut fur Festkorperforschung.
Grenoble Hochfeld-Magnetlabor, Grenoble CEDEX 9, France.

April 1987 to July 1990:
Research Assistant at the University of Chicago
James Franck Institute, Chicago IL 60637, U.S.A.

TEACHING EXPERIENCE:

September 1996 to present:

- Instructor for a variety of Physics classes.
  freshman and sophomore level: *College Physics* and *University Physics*
  junior level: *Analytical Mechanics*
  senior level: *Thermal Physics*, *Quantum Mechanics*, and *Solid State Physics*
  graduate level: *Quantum Mechanics* and *Statistical Physics*.
  Department of Physics, University of North Dakota

July 1992 to August 1992 :

- Lecturer for a freshman level *Electromagnetism* course
  Department of Physics, The Johns Hopkins University

April 1992 to May 1992 :

- Guest lecturer for a graduate level *Superconductivity* course
  Applied Physics Laboratory, The Johns Hopkins University

October 1988 to June 1989 :

- Laboratory assistant for a senior level *Solid State Physics* course
  under the supervision of Prof. H. Fritzche
  Department of Physics, The University of Chicago
- Laboratory assistant for a senior level *Nuclear Physics* course
  under the supervision of Prof. R. Levi-Setti
  Department of Physics, The University of Chicago
- Teaching assistant for a graduate level *Statistical Physics* course
  under the supervision of Prof. S. Nagel
  Department of Physics, The University of Chicago

Advisees at UND:

Scott D. Crockett (Undergraduate)
Jade E. Warren (Undergraduate)
Damien C. Mathew (Undergraduate) North Dakota Advanced Undergraduate Research Award Student, Summer 1998.
Edward C. Peterson (Undergraduate) North Dakota Advanced Undergraduate Research Award Student, Summer 1998.
John R. Pendray (Undergraduate) a student in Research Experience for Undergraduates Program in the Physics Department, Summer 1998.
Lance Lohstreter (Undergraduate) a student in Research Experience for Undergraduates Program in the Physics Department, Summer 1999.
Karen Bogenschutz (Undergraduate) a student in Research Experience for Undergraduates Program in the Physics Department, Summer 2001.
Issac D. O'Bryant (Undergraduate) a student in Research Experience for Undergraduates Program in the Physics Department, Summer 2005.
Chris Olson (Undergraduate) a student in Research Experience for Undergraduates Program in the Physics Department, Summer 2006.
Mathew Nitschke (Undergraduate)
Jennifer Vagle (Undergraduate)
Brent Thomson (Undergraduate)
Clinton Hall (Undergraduate)
Dustin E. Bosch (Undergraduate)

Art Onwan (Graduate) M.S. student in Physics.
Dexian Ye (Graduate) M.S. student in Physics
Brita L. Nellermoe (Graduate) M.S. student in Physics.
Janardan Pokharel (Graduate) M.S. student in Physics.
Ramesh Dhungana (Graduate) Ph.D. student in Physics.

Advisees at Other Institutions:(thru collaboration)

Pavi Sandhu (Graduate) Ph.D. student in Boston University.
So-young Han (Graduate) Ph.D. student in Florida State University.

Thesis Directed:

Microwave conductivity for s-wave superconductors
thesis of Brita L.Nellermoe
M.S. student in Physics (graduated in May 2000).

Collective dynamics of Josephson vortices in high temperature superconductors
thesis of Janardan Pokharel
M.S. student in Physics (graduated in December 2002).

Long Josephson junction stack as superconducting devices
dessertation of Ramesh Dhungana
Ph.D. student in Physics (in progress).

Entanglement of two Josephson vortex qubits
thesis of Isaac O'Bryant
M.S. student in Physics (in progress).

GRANT ACTIVITIES:

- NSF EPSCoR grant, *Interacting electrons in low dimensional conductors in high magnetic fields* (5/1/97-6/30/98, $18,000).
- Research Seed Money grant, *High temperature superconductors* (6/1/00-6/30/01, $23,000).
- Summer Graduate Research Professorship (6/11/01-8/03/01, $6,000).
- NSF EPSCoR grant, *Collective Josephson vortex dynamics in high temperature superconuctors* (6/1/02-4/15/04, $37,500).

AWARDS:

- Co-winner of Gregor Wenzel prize for undergraduate teaching (1986)

INVITED TALKS AT INTERNATIONAL CONFERANCES:

- First CINVESTAV Superconductivity Symposium (Oaxtepec, Mexico, 12/11-14/90).
- Third International Conference on New Theories, Discoveries and Applications of Superconductors and Related Materials (Honolulu, Hawaii, 01/15-19/01).
- Fourth International Conference on New Theories, Discoveries and Applications of Superconductors and Related Materials (San Diego, California, 01/16-21/03).
- Eighth International Conference on Materials and Mechanisms of Superconductivity - High Temperature Superconductors (Dresden, Germany, 07/09-14/06).

MISCELLANEOUS:

I set up *Physics Computational Laboratory* which consists of six UNIX computer workstations in the Physics Department at the University of North Dakota for students and faculty.

RESEARCH INTERESTS:

Superconductivity:
- Strongly correlated systems
- Physical property of superconductors

Superconducting nano-electronic devices:
- Terahertz Josephson junction devices
- Decoherence in superconductor quantum bits

Collective phenomena in active particle systems:
- Collective excitations in neuronal network

REFERENCES:

(1). Prof. K. Levin
The James Franck Institute
The University of Chicago, Chicago, IL 60637
Tel: (312) 702-7186 (office) E-mail: k-levin@uchicago.edu
FAX: (312) 702-5863

(2). Prof. J. R. Schrieffer
National High Magnetic Field Laboratory
1800 E. Paul Dirac Dr., Tallahassee, FL 32310
Tel: (850) 644-3203 (office) E-mail: schrieff@magnet.fsu.edu
FAX: (850) 644-5038

(3). Prof. J. S. Brooks
National High Magnetic Field Laboratory
1800 E. Paul Dirac Dr., Tallahassee, FL 32310
Tel: (850) 644-2836 (office) E-mail: brooks@magnet.fsu.edu
FAX: (850) 644-5038

(4). Prof. Tar-Pin Chen, Chair
Department of Physics and Astronomy
Univeristy of Arkansas, Little Rock, AR 72204-1099
Tel: (501) 569-8963 (office) E-mail: txchen@ualr.edu

(5). Dr. Dong Ho Wu
Code 6333
Naval Research Laboratory, Washington, DC 20375
Tel: (202) 767-2972 (office) E-mail: dhwu@ccsalpha3.nrl.navy.mil

LIST OF PUBLICATIONS:

1. *The Kondo boson theory of the dynamic susceptibility of heavy fermions*
   A. Auerbach, J. H. Kim and K. Levin
   Physica B 140, 50 (1987).

2. *Theory of antiferromagnetic correlations and neutron-scattering cross section in heavy fermion metals*
   A. Auerbach, J. H. Kim, K. Levin and M. Norman
   Phys. Rev. Lett. 60, 623 (1988).

3. *Electron-phonon interactions in copper oxides*
   J. H. Kim, K. Levin, R. Wentzcovich and A. Auerbach
   Physica C 162-164, 1463 (1989).

4. *Assessment of Fermi liquid description for the normal state of high-Tc superconductors*
   J. H. Kim, K. Levin and A. Auerbach
   Phys. Rev. B 39, 11633 (1989).

5. *Electron-phonon interactions in the copper oxides: implications for the resistivity*
   J. H. Kim, K. Levin, R. Wentzcovitch and A. Auerbach
   Phys. Rev. B 40, 11378 (1989).

6. *NMR relaxation and neutron scattering in a Fermi liquid picture of the metallic copper oxides*
   J. P. Lu, Q. Si, J. H. Kim and K. Levin
   Phys. Rev. Lett. 65, 2466 (1990).

7. *Phenomenological description of the copper oxides as almost localized Fermi liquids*
   Q. Si, J. H. Kim, J. P. Lu and K. Levin
   Phys. Rev. B 42, 1033 (1990).

8. *Metallic copper oxides as an almost localized Fermi liquid*
   J. H. Kim, Q. Si, J. P. Lu and K. Levin
   Physica B 163, 275 (1990).

9. *Spinless fermions on frustrated lattices in a magnetic field*
   W. Barford and J. H. Kim
   Phys. Rev. B 43, 559 (1991).

10. *From fermiology to spin dynamics: current status of Fermi liquid based approaches to the cuprates*
    K. Levin, Q. Si, Y. Zha, J. H. Kim and J. P. Lu
    J. Phys. Chem. Solids 52, 1337 (1991).

11. *The effect of strong coulomb correlations on electron-phonon interactions in the copper oxides: implications for transport*
    J. H. Kim, K. Levin, R. Wentzcovitch and A. Auerbach
    Electron-Phonon Interaction in Oxide Superconductors Edited by R. Baquero
    (World Scientific, Singapore, 1991).

12. *Normal state properties in the cuprates and their Fermi liquid based interpretation*
    K. Levin, J. H. Kim, J. P. Lu and Q. Si
    Physica C 175, 449 (1991).

13. *Electron-phonon interactions in the high temperature superconductors*

J. H. Kim, K. Levin, R. Wentzcovitch and A. Auerbach
Phys. Rev. B 44, 5148 (1991).

14. *Microscopic Fermi liquid theory of NMR relaxation and neutron scattering in the metallic copper oxides*
J. P. Lu, Q. Si, J. H. Kim and K. Levin
Physica C 179, 191 (1991).

15. *Current status of Fermi liquid based approaches to the cuprates*
K. Levin, Q. Si, J. H. Kim and J. P. Lu
High-Temperature Superconductivity, Edited by J. Ashkenazi *et al.*
(Plenum Press, New York, 1991).

16. *The doped Hubbard antiferromagnet: instability and effective interactions*
A. Singh, Z. Tešanović and J. H. Kim
Phys. Rev. B 44, 7757 (1991).

17. *Strong coulomb correlation effects on the electron-phonon contributions to transport and superconductivity*
J. H. Kim and K. Levin
Lattice Effects in High-Tc Superconductors, Edited by Y. Bar-Yam *et al.*
(World Scientific, Singapore, 1992).

18. *Electrons confined on the surface of a sphere in a magnetic field*
J. H. Kim, I. D. Vagner and B. Sundaram
Phys. Rev. B 46, 9501 (1992).

19. *Instability of the spiral state of the doped Hubbard model*
A. Singh, Z. Tešanović and J. H. Kim
Pramana-J. Phys. 38, L211 (1992).

20. *Is the phonon mechanism for superconductivity possible in strongly correlated systems?*
J. H. Kim and Z. Tešanović
Lattice Effects in High-Tc Superconductors, Edited by Y. Bar-Yam *et al.*
(World Scientific, Singapore, 1992).

21. *Strong coulomb correlation and lattice effects on de Haas-van Alphen oscillations*
J. H. Kim and I. D. Vagner
J. Phys. Chem. Solids 54, 1269 (1993).

22. *Effects of strong coulomb correlations on the phonon mediated superconductivity : a model inspired by copper oxides*
J. H. Kim and Z. Tešanović
Phys. Rev. Lett. 71, 4218 (1993).

23. *Lattice effects on de Hass-van Alphen oscillations in strongly correlated systems*
J. H. Kim and I. D. Vagner
Phys. Rev. B 48, 16564 (1993).

24. *A model for giant magnetoresistance in magnetic granular solids*
J. H. Kim, J. Q. Xiao, C. L. Chien, Z. Tešanović and L. Xing
Solid State Commun. 89, 157 (1994).

25. *Electron-phonon assisted nuclear spin relaxation in two dimensional electron systems*
J. H. Kim, I. D. Vagner and L. Xing
Phys. Rev. B 49, 16777 (1994).

26. *Effects of finite concentration in Kondo alloy systems*
L. P. Gor'kov and J. H. Kim,
Physica C 235-240, 2451 (1994).

27. *Effects of temperature dependent spin wave damping in the two-dimensional Hubbard antiferromagnet*
J. H. Kim
Synthetic Metals 71, 1631 (1995).

28. *Effect of finite concentration in Kondo alloys: an approach to the heavy fermion problems*
L. P. Gor'kov and J. H. Kim
Phys. Rev. B 51, 3971 (1995).

29. *Thermodynamics of alloys with magnetic impurities*
L. P. Gor'kov and J. H. Kim
Physical Phenomena at High Magnetic Fields II, Edited by Z. Fisk *et al.*
(World Scientific, Singapore, 1996) p. 197.

30. *Interplay between the Kondo effect and the RKKY interaction in the two-impurity model*
L. P. Gor'kov and J. H. Kim
Philos. Mag. B 74, 447 (1996).

31. *Origin of anomalous magnetic breakdown frequencies in quasi-two dimensional organic conductors*
P. S. Sandhu, J. H. Kim, and J. S. Brooks
Phys. Rev. B 56, 11566 (1997).

32. *Realistic Hofstadter energy spectrum and ensemble dependent de Haas-van Alphen effect in* α*-(ET)*$_2$*KHg(SCN)*$_4$
S. Y. Han, J. H. Kim, and J. S. Brooks
Synthetic Metals 101-103, 2084 (1999).

33. *Anomalous temperature dependence of upper critical field in type-II superconductors*
J. H. Kim and Z. Tešanović
Physical Phenomena at High Magnetic Fields III, Edited by Z. Fisk *et al.*
(World Scientific, Singapore, 1999) p. 376.

34. *Magnetic breakdown phenomenon in quasi-two dimensional organic conductors: A quantum model inspired by a realistic band structure*
J. H. Kim, S. Y. Han, and J. S. Brooks
Phys. Rev. B 60, 3213 (1999).

35. *Effects of incomplete superconducting condensation in s-wave superconductors*
J. H. Kim
Phys. Rev. B **61**, 3579 (2000).

36. *Effects of incomplete superconducting condensation on electronic thermal conductivity at very low temperatures*
J. H. Kim
Physica C **341-348**, 1865 (2000).

37. *Magnetic breakdown at high magnetic fields: semi-classical and quantum treatments*
S. Y. Han, J. S. Brooks and J. H. Kim
Phys. Rev. Lett. **85**, 1500 (2000).

38. *Microwave response of superconductors with uncondensed quasiparticles at low temperatures*
J. H. Kim and B. L. Nellermoe
Physica C **341-348**, 1673 (2000).

39. *Unusual electron-phonon superconductivity in nickel borocarbides?*
J. H. Kim and D. H. Wu
Physica C **364-365**, 24 (2001)

40. *Collective mode in Josephson-coupled layered superconductors in weak parallel magnetic fields*
J. H. Kim
Int. J. Mod. Phys. B **15**, 3347 (2001).

41. *Quantum phase transitions in one-dimensional long Josephson junction stacks in parallel magnetic fields*
J. H. Kim
Phys. Rev. B **65**, 100509 (R) (2002).

42. *Collective Josephson vortex dynamics in long Josephson junction stacks*
J. H. Kim and J. Pokharel
Physica C **384**, 425 (2003).

43. *Effects of quantum and thermal fluctuations on the stability of mutual phase-locking in long Josephson junction stacks*
J. H. Kim
Int. J. Mod. Phys. B **17**, 3708 (2003).

44. *Effects of incomplete superconducting condensation on electron tunneling*
J. H. Kim
Int. J. Mod. Phys. B **17**, 3293 (2003).

45. *Macroscopic quantum tunneling of phased-locked fluxons in coupled long Josephson junctions*
J. H. Kim and Kyungsun Moon
Phys. Rev. B **71** 104524 (2005).

46. *Decoherence in Josephson vortex quantum bits: Long-Josephson-junction approach to a two-state system*
J. H. Kim, R. Dhungana and K.-S. Park
Phys. Rev. B **73**, 214506 (2006).

47. *Decoherence in Josephson vortex quantum bits*
J. H. Kim, R. Dhungana and K.-S. Park
(Accepted for publication in Physica C.)

48. *Quantum phase transitions in weakly dissipative long Josephson junction stacks*
J. H. Kim
(Submitted for publication).

49. *Effects of resonant cavity on macroscopic quantum tunneling of fluxon in long Josephson junctions*
J. H. Kim, and R. Dhungana
(Manuscript in preparation).