

Rahul P. Hardikar

CONTACT INFORMATION

Present Address:
5523 Ashview Dr., Apt G,
Indianapolis, IN 46237 USA
Voice: (662) 312-3824

Office Address:
FC-142
Department of Computer Science
and Software Engineering
Butler University
Indianapolis, IN 46208 USA
E-mail: rhardika@butler.edu
Voice: (317) 940-9649

EDUCATION

Mississippi State University, Mississippi State, MS 39762 USA

Ph.D., James Worth Bagley College of Engineering December 2007

- Dissertation Topic: “Dynamic electron-phonon interactions in one-dimensional models”
- Advisor: Associate Professor R. Torsten Clay

M.S., College of Arts and Sciences December 2004

- “Thesis Topic: Investigations of order parameters and critical coupling for the Peierls Extended Hubbard model at one-quarter filling”
- Advisor: Associate Professor R. Torsten Clay

Maharaja Sayajirao University, Vadodara, Gujarat, INDIA

B.S., Faculty of Science, May 2000

ACADEMIC EXPERIENCE

Mississippi State University, Mississippi State, MS USA

Graduate Research Assistant, Department of Physics and Astronomy & HPCC's
Center for Computational Science **Jan 2003 to Dec 2007**

Build and analyze data quantum Monte Carlo algorithms for theoretical models.
Work on high performance computers and cluster computers.
Theoretically research organic superconductors and semiconductors and examine
their phase diagrams.

Graduate Teaching Assistant, Department of Physics and Astronomy **Jan 2003 to
Dec 2007**

Taught General Physics and Physical Science Labs as a *certified teaching assis-
tant*.
Duties involved teaching labs, grading lab reports, providing and proctoring lab
exams (Physical science labs).

RESEARCH INTERESTS

Strongly correlated electron systems, Quantum Monte Carlo algorithm, High Perfor-
mance Computing, Parallel algorithms.

PUBLICATIONS

“Temperature-driven transition from the Wigner crystal to bond-charge-density wave in
quasi-one-dimensional quarter-filled band”, R. T. Clay, R. P. Hardikar, and S. Mazum-
dar, *Phys. Rev. B* **76**, 205118 (2007), 12 pages.

“Phase diagram of the one-dimensional Hubbard-Holstein Model at half and quarter
filling”, R. P. Hardikar, and R. T. Clay, *Phys. Rev. B*, **75**, 245103 (2007), 10 pages.

“Intermediate Phase of the One Dimensional Half-Filled Hubbard-Holstein Model”,
R. T. Clay, and R. P. Hardikar, *Phys. Rev. Lett.*, **95**, 096401 (2005), 4 pages.

CONFERENCE
PRESENTATIONS

“Spin-soliton excitations from the Bond-Charge-Density Wave spin-Peierls state in the $\frac{1}{4}$ -filled band”, R. T. Clay, R. P. Hardikar, and S. Mazumdar, *2008 APS March Meeting*, New Orleans, Louisiana.

“Temperature dependence of charge-ordering in $(\text{TMTCF})_2\text{X}$, $\text{C} = \text{S, Se}$ ”, Sumit Mazumdar, Rahul Hardikar, and R. T. Clay, *2008 APS March Meeting*, New Orleans, Louisiana.

“Mixed spin-charge solitons and thermodynamics of $(\text{TMTTF})_2\text{X}$ ”, Sumit Mazumdar, R. Torsten Clay, and R. P. Hardikar, *2007 APS March Meeting*, Denver, Colorado.

“Phase diagram of the one dimensional Hubbard-Holstein Model at $\frac{1}{2}$ and $\frac{1}{4}$ filling”, Rahul Hardikar, and Torsten Clay, *2007 APS March Meeting*, Denver, Colorado.

“Mixed spin-charge solitons and the phase diagram of $(\text{TMTCF})_2\text{X}$, $\text{C} = \text{S, Se}$ ”, R. T. Clay, R. P. Hardikar, and S. Mazumdar, *7th International Symposium on Crystalline Organic Metals, Superconductors, and Ferromagnets (ISCOM) (2007)*, Peniscola, Spain.

“Metallic Phases in one dimensional Molecular Conductors”, Rahul Hardikar, and R. Torsten Clay, *Mississippi Academy of Sciences (MAS) (2007)*, Mississippi State University, MS.

“Temperature dependent competition between charge-ordering and spin-Peierls transition in $(\text{TMTTF})_2\text{X}$: the role of quantum phonons”, R. T. Clay, R. P. Hardikar, and S. Mazumdar, *2006 APS March Meeting*, Baltimore, MD.

“Spin Peierls transition within the $\frac{1}{4}$ -filled Peierls extended Hubbard model”, R. P. Hardikar, and R. Torsten Clay, *2005 APS March Meeting*, Los Angeles, CA.

“Phase diagram of the one dimensional $\frac{1}{2}$ -filled Hubbard-Holstein model”, R. T. Clay, and R. P. Hardikar, *2005 APS March Meeting*, Los Angeles, CA.

PROFESSIONAL
EXPERIENCE

Butler University, Indianapolis, Indiana USA

Post-doctoral faculty/Lecturer

Aug 2008 to present

- Conduct inter-disciplinary (Computational Physics & Computer Science) research on Butler’s new super computer “*The Bigdawg*”.
- Teach one special topics course related to supercomputing or parallel computing every semester.
- Conduct workshops and/or one-on-one sessions with faculty and students and encourage them to use the supercomputer for research purpose.

COMPUTER SKILLS

Programming Languages: Message Passing Interface (MPI), OpenMP, C, C++, FORTRAN, Mathematica.

Applications: L^AT_EX, Microsoft Office, OpenOffice.org, Xmgrace, Gnuplot, Emacs.

Operating Systems: Solaris, Unix, Linux (Suse, Fedora Core), Windows(XP/Vista).

REFERENCES

Available upon request.