

Curriculum Vitae

Muslema Pervin

Born: December 1971; Bangladesh
Citizenship: Bangladeshi
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Education:

- Florida State University, Tallahassee, Florida, USA, 2000-2005
Ph. D. in Physics, Summer 2005
Major Professors: Dr. Simon Capstick, Dr. Winston Roberts
Thesis title: "Semileptonic Decay of Heavy Baryons in a Constituent Quark Model"
- Southern Illinois University, Carbondale, Illinois, USA, 1999-2000
In M. S. program. Transferred to Florida State University
- University of Dhaka, Dhaka, Bangladesh, 1992-1993 (Academic Year)
M. Sc. in Physics, 1997
Thesis supervisor: Professor L. M. Nath
Thesis title: "CP Violation in Neutral Kaon Decays and the Standard Model"
- University of Dhaka, Dhaka, Bangladesh, 1989-1992 (Academic Year)
B. Sc. with Honors in Physics, 1994

Research Experience:

- Postdoctoral Fellow:
Physics Division, Argonne National Laboratory, Illinois
2006-Present
Nuclear Structure and Reactions:
The variational Monte Carlo (VMC) and Green's function Monte Carlo (GFMC) techniques are powerful tools for calculating properties of light nuclei. In collaboration with R. B. Wiringa and S. C. Pieper, both of whom are at ANL, I am now involved in a project exploring some nuclear electroweak transitions,

using the GFMC technique and the AV18 + IL2 potential for nuclei with $A=6$ to 9. The GFMC results for transition matrix elements for $A=6, 7$ nuclei are in preparation for publication. In the near future I also expect to start working with K. M. Nollett at ANL on scattering problems in GFMC, with the ultimate goal of computing low-energy electroweak capture reactions.

Hadronic Physics:

A constituent quark model has been used to obtain the baryon spectra and semileptonic form factors and decay rates of heavy baryons. With W. Roberts (FSU) I am now working on a project which attempts to unify the spectra of heavy mesons and baryons using a single set of parameters in the Hamiltonian. We plan to extend this project to examine the strong decays of excited heavy hadrons.

A calculation of semileptonic decay of light baryons, which involves an exact numerical computation of form factors, using the constituent quark model is also planned

- Research Assistant:

Department of Physics, Florida State University, Tallahassee, Florida
2002-2005

Worked on a project involving different aspects of semileptonic decays of baryons in a quark model. This project includes calculation of form factors and rates of both heavy Λ and Ω baryons decaying semileptonically. Work has been published recently in Phys. Rev. C 74, 025205 (2006) and in Phys. Rev. C 72, 035201 (2005).

- Research Fellow:

University Grants Commission, Dhaka, Bangladesh
1998-1999

Involved in research on Two-pion Exchange Three-nucleon Potential ($2\pi E - 3NP$) with Prof. K. Kabir and Prof. L. M. Nath at the University of Dhaka, Bangladesh. In this research project we have studied $2\pi E - 3NP$ using a approximate $SU(2) \times SU(2)$ chiral symmetry. The off-shell pion-nucleon scattering amplitudes obtained from the Weinberg Lagrangian are supplemented with the contributions of the well-known σ -term and the $\Delta(1232)$ exchange. This work was published in Int. J. Mod. Phys. E9 157 (2000).

- M. Sc. Research:

University of Dhaka, Dhaka, Bangladesh
1995-1997

Worked on CP violation in both neutral K and B-meson sectors within the framework of standard electroweak model under the supervision of Prof. L. M. Nath, Physics Department, University of Dhaka. Predictions for the values of the CKM parameter δ and the CP violating phase $\sin(2\beta)$ involved in B-meson decay were made by evaluating the parametrization-independent quantity J which is twice the area of the unitarity triangle of the CKM matrix. This work was submitted as a dissertation for M. Sc. in physics and published later in

J. Phys. G24, 1693 (1998). The predicted values are: $\delta = 70 \pm 6$, $\sin(2\beta) = 0.68 \pm 0.13$ and $J = 2.68 \pm 0.77 \times 10^{-5}$, whereas the most recent (2006) Review of Particle Properties (PDG) values are $\delta = 57_{-11}^{+5}$, $\sin(2\beta) = 0.69 \pm 0.032$ and $J = 3.08 \pm 0.17 \times 10^{-5}$.

Teaching Experience

- Adjunct Professor;
Department of Physics, Florida State University, Tallahassee, Florida
Fall, 2005
Course instructor for calculus based mechanics course. Teaching responsibilities included helping students with their homework problems, supervising the laboratory classes, making and grading exams.
- Teaching Assistant:
Department of Physics, Florida State University, Tallahassee, Florida
2000-2001
Responsibilities included teaching introductory physics laboratories. This involved assembling laboratory equipment, lecturing on laboratory procedure and related theory, and grading written laboratory assignments.
- Teaching Assistant:
Department of Physics, Southern Illinois University, Carbondale, Illinois
1999-2000
Responsibilities included grading undergraduate mechanics and electrodynamics course homework and helping students in problem solving in a recitation class.

Publications

- [1] M. Pervin, W. Roberts and S. Capstick, *Semileptonic Decays of Heavy Omega Baryons in a Quark Model*, Phys. Rev. C74, 025205 (2006).
- [2] M. Pervin, W. Roberts, S. Capstick, *Semileptonic Decays of Heavy Lambda Baryons in a Quark Model*, Phys. Rev. C72, 035201 (2005).
- [3] K. Kabir, T. K. Dutta, M. Pervin, L. M. Nath, *The Role of $\Delta(1232)$ in Two-pion Exchange Three-nucleon Potential*, Int. J. Mod. Phys. E9, 157 (2000).
- [4] M. Pervin, N. Ahsan, K. Kabir, L. M. Nath, *Standard Model and CP Violations in Neutral K- and B-meson Systems*, J. Phys. G24, 1693 (1998).

Talks and Seminars

- [1] *Ab-initio Calculations of Electroweak Matrix Elements*, October 13, 2006, Midwest Theory Get-Together, Argonne National Laboratory; October 26, 2006, contributed talk at DNP meeting of American Physical Society.
- [2] *Baryon Spectra and Semileptonic Decay in a Constituent Quark Model*, October 22, 2006, contributed talk at GHP meeting of American Physical Society.
- [3] *Some Aspects of Semileptonic Decay of Baryons*, April, 2005, contributed talk at April meeting of American Physical Society.
- [4] *Some Aspects of Semileptonic Decay of Baryons in a Quark Model*, February 1, 2005, Nuclear Theory seminar at Argonne National Laboratory; March 3, 2005, Nuclear Physics seminar at Indiana University.
- [5] *Form Factors and Rates of Semileptonic Decay of Λ Baryons*, November 12, 2004, Nuclear Physics seminar at Florida State University.
- [6] *Some Aspects of Semileptonic Decay of Λ Baryons in a Quark Potential Model*, October 15, 2004, Theory seminar at Thomas Jefferson National Accelerator Facility, Newport News, VA.
- [7] *Semileptonic Decay of Baryons in a Quark Model*, June 18, 2003, At Hampton University Graduate Studies (HUGS), Thomas Jefferson National Accelerator Facility, Newport News, VA, June 2-20, 2003.
- [8] *Semileptonic Decay of Baryons in a Quark Potential Model*, April 4, 2003, Nuclear Physics seminar at Florida State University.

- [9] *Semileptonic Decay of Hadrons*, August 9, 2002, Nuclear Physics Summer School, St. John's College, Santa Fe, NM.

Honors and Prizes

- University Grants Commission, Bangladesh Fellowship, 1998-1999
- Dhaka University Honors Scholarship, Bangladesh, 1992-1993

Computer Skills

- Language: Fortran77.
- Software: Mathematica (Including Experience with High energy Physics Instruction (HIP), and FeynCalc packages), Maple, Mathcad, Microsoft Office.
- Platform: Red hat Linux, Microsoft Windows.

Professional Affiliation

- Member: American Physical Society
- Member: Topical Group of Hadronic Physics