

Raghavendra Srikanth H

Research Summary:

During this current academic year I have concentrated on new physics at the TeV scale. I have worked in models like supersymmetry and little Higgs. I have tackled the following three problems.

- The data from neutrino oscillation experiments indicate that the neutrino mass is very small and the mixing pattern in the lepton sector is bilarge. We have tried to explain this data in a specific R-parity violating supersymmetric model, which is induced at the TeV scale by Planck scale physics.
- To explain the smallness of neutrino mass and the mixing pattern in the lepton sector, models based on lepton number violation by 2 units exist. From cosmological observations, there seem to exist an unknown matter which is different from the matter which we know. Can we understand the reasons for the existence of dark matter and the lepton number violation by 2 units in a single theory? We have tried to understand this in a supergravity model.
- To explain the dark matter in the universe we need a weakly interacting, stable and neutral particle. In the littlest Higgs model with T-parity a natural candidate for dark matter exists, which is known as heavy photon. The analogous particle in the minimal version of supersymmetry is neutralino. A Higgs boson can decay into a pair of heavy photons or neutralinos, depending on the model we consider. These decays are invisible. We have computed the invisible Higgs decay branching ratio in the littlest Higgs model with T-parity. We have found that this branching ratio is considerably larger than that in the minimal version of supersymmetry. We have pointed that this channel can be used to distinguish models which indicate new physics at the TeV scale.

Publications:

1. Biswarup Mukhopadhyaya and Raghavendra Srikanth, *Bilarge neutrino mixing in R-parity violating supersymmetry: The Role of right-chiral neutrino superfields*, Physical Review D 74, 075001, (2006)

Preprints:

1. Biswarup Mukhopadhyaya, Soumitra SenGupta and Raghavendra Srikanth, *Supergravity reconciles dark matter with lepton number violating neutrino masses*, arXiv: hep-ph/0609304
2. Raghavendra Srikanth Hundi, Biswarup Mukhopadhyaya and Andreas Nyfeler, *Invisible Higgs boson decay in the Littlest Higgs model with T-parity*, arXiv: hep-ph/0611116

Conference/Workshops Attended:

1. *Topical Meeting on Physics at the LHC*, India, December, 2006.
2. *WIN07*, India, January, 2007.

Visits to other Institutes:

1. Indian Association for the Cultivation of Science, Kolkata, India, July, 2006.
2. University of California, Riverside, USA, October, 2006.
3. University of Oregon, Eugene, USA, October, 2006.
4. University of Wisconsin, Madison, USA, October, 2006.
5. University of Illinois, Urbana-Champaign, USA, October, 2006.
6. University of Maryland, College Park, USA, October, 2006.
7. Syracuse University, Syracuse, USA, October, 2006.
8. Cornell University, Ithaca, USA, November, 2006.
9. Stanford Linear Accelerator Center, Menlo Park, USA, November, 2006.
10. Brookhaven National Laboratory, Upton, USA, November, 2006.
11. Fermi National Laboratory, Batavia, USA, November, 2006.

Invited Lectures/Seminars:

1. I gave seminars on *Bilarge neutrino mixing and lepton number violation in supersymmetric models* at my visiting places in USA during October-November, 2006.