

Sanjib Kumar Agarwalla

Research Summary:

My work is mainly focused on the precision measurements of the neutrino oscillation parameters mainly the issue of neutrino mass ordering and θ_{13} in the planned/proposed next generation long baseline neutrino experiments like Beta Beam, Neutrino factory. In this context, we have studied the prospects of a Beta Beam source at CERN and ICAL at INO as the far detector. The CERN-INO distance is close to the so-called “magic” baseline which helps to remove some of the parameter degeneracies and allows for a better measurement of the neutrino mass hierarchy and θ_{13} .

We have explored the possibility of seeing the clear signal of new-physics in r-parity violating supersymmetric scenario with Beta Beam in a near and a far detector.

I have done some renormalization group evolution analysis (RGE) in the light of the high scale mixing unification hypothesis with the help of Prof. M. K. Parida.

I am a member of India-Based Neutrino Observatory (INO) Collaboration and I have done some simulation study with Nuance and Geant.

Publications:

1. Rathin Adhikari, Sanjib Kumar Agarwalla, Amitava Raychaudhuri, *Can R-parity violating supersymmetry be seen in long baseline beta-beam experiments?*, Phys.Lett.B **642**, 111-118, (2006)
2. Sanjib Kumar Agarwalla, Subhendu Rakshit, Amitava Raychaudhuri, *Probing Lepton Number Violating Interactions with Beta-beams.*, Phys.Lett.B **647**, 380-388, (2007)
3. Sanjib Kumar Agarwalla, Sandhya Choubey, Amitava Raychaudhuri, *Neutrino mass hierarchy and θ_{13} with a magic baseline beta-beam experiment.*, Nuclear Physics B **771**, 1-27, (2007)
4. S.K. Agarwalla, M.K. Parida, R.N. Mohapatra, G. Rajasekaran, *Neutrino Mixings and Leptonic CP Violation from CKM Matrix and Majorana Phases.*, Phys.Rev.D **75**, 033007, (2007)

Preprints:

1. Sanjib Kumar Agarwalla, Sandhya Choubey, Srubabati Goswami, Amitava Raychaudhuri, *Neutrino parameters from matter effects in the ν_e survival probability at long baselines.*, hep-ph/0611233

Conference/Workshops Attended:

1. *2nd phase of INO SCHOOL*, VECC/SINP, Kolkata, India, May 1-13, 2006.
2. *17th DAE-BRNS Symposium on HEP*, IIT KHARAGPUR, India, Dec, 2006.
3. *21st International Workshop on Weak Interactions and Neutrinos (WIN07)*, SINP, Kolkata, India, Jan, 2007.
4. *Joint Indo - German School and Workshop 2007 (JIGSAW '07)*, TIFR, Mumbai, India, February, 2007.
5. *INO Collaboration meeting*, University of Delhi, Delhi, India, 9th March, 2007.
6. *International Workshop on Theoretical High Energy Physics (IWTHEP)*, IIT, Roorkee, India, March, 2007.

Visits to other Institutes:

1. Physical Research Laboratory, Ahmedabad, India, January, 2007.
2. Centre for Theoretical Physics, Jamia Millia Islamia, New Delhi, India, March, 2007.

Invited Lectures/Seminars:

1. *Physics reach of CERN-INO baseline with beta beams*, Poster presented at Neutrino 2006, Santa Fe, USA, June, 2006.
2. *Neutrino mass hierarchy and θ_{13} with a magic baseline Beta Beam experiment*, 17th DAE-BRNS Symposium on HEP, IIT, KHARAGPUR, India, December, 2006.
3. *Neutrino mass hierarchy and θ_{13} with a magic baseline Beta Beam experiment*, Theoretical Physics Seminar Circuit talk, Physical Research Laboratory, Ahmedabad, India, January, 2007.
4. *Neutrino mass hierarchy and θ_{13} with a magic baseline Beta Beam experiment*, WIN07, SINP, Kolkata, India, January, 2007.
5. *Neutrino mixings and leptonic CP violation from CKM matrix and Majorana phases*, WIN07, SINP, Kolkata, India, January, 2007.
6. *New physics search at INO*, Poster presented at Joint Indo - German School and Workshop 2007 (JIGSAW '07), TIFR, Mumbai, India, February, 2007.

7. *Neutrino mixings and leptonic CP violation from CKM matrix and Majorana phases*, Joint Indo - German School and Workshop 2007 (JIGSAW '07), TIFR, Mumbai, India, February, 2007.
8. *Prospects of INO with Beams*, INO Collaboration meeting, University of Delhi, Delhi, India, March, 2007.
9. *Neutrino mass hierarchy and θ_{13} with a magic baseline Beta Beam experiment*, International Workshop on Theoretical High Energy Physics (IWTHEP) , IIT, Roorkee, India, March, 2007.

Other Activities:

1. INO Training School, Seven tutorials on neutrino physics, April, 2006.
2. Participated in the “Topical Meeting on Physics at the LHC”, December, 2006.
3. Pheno lunch review talks and extension talk.