

Raj Gandhi

Research Summary:

During 2006 - 2007, I have been working mainly on the following areas:

1. Matter Effects in Atmospheric Neutrinos
2. Physics issues with a Neutrino Factory
3. Physics Potential of INO
4. Ultra-high Energy Cosmic Ray Muons

Publications:

1. R. Gandhi and S. Panda, "Probing the cosmic ray 'knee' and very high energy prompt muon and neutrino fluxes via underground muons," JCAP **0607**, 011 (2006) [arXiv:hep-ph/0512179].
2. R. Gandhi and W. Winter, "Physics with a very long neutrino factory baseline," Phys. Rev. D **75**, 053002 (2007) [arXiv:hep-ph/0612158].
3. R. Gandhi *et al.*, "Working Group Report: Astroparticle And Neutrino Physics," Pramana **67**, 735 (2006).

Preprints:

1. M. S. Athar *et al.* [INO Collaboration], "India-based Neutrino Observatory: Project Report. Volume I,"
2. The ISS Physics Working Group, "*Physics at a Future Neutrino Factory and beta-beam Facility*" in preparation, current draft at <http://www.hep.ph.ic.ac.uk/>
3. R. Gandhi, P. Ghoshal, S. Goswami, P. Mehta, S. Uma Sankar & S. Shalgar, *Mass Hierarchy Determination in future Atmospheric Neutrino Detectors*, (In preparation).

Visits to other Institutes:

1. TIFR, April 2006.
2. Institute for Advanced Studies, Princeton, May 2006.

Invited Talks, Seminars and Colloquia:

1. *Physics with the Indian Neutrino Observatory*, School of Natural Sciences Colloquium, TIFR, April 2006.
2. *Probing Very High Energy Cosmic Ray Muons*, Theory Seminar, TIFR, April 2006.
3. *Very High Energy Cosmic Ray Muon Detection*, Talk at PHENO 06, Madison, May 2006.
4. *Physics Potential of INO*, Invited Talk at "Next Generation Neutrino and Nucleon Decay Detectors" Seattle, September, 2006.
5. *Physics With a Very Long Baseline*, Talk at "Weak Interactions and Neutrino Physics " (WIN07) Kolkata , January, 2007.
6. *Some Physics Issues with a Very Long Neutrino Factory baseline*, Talk at "Joint Indo-German School and Workshop" (JIGSAW 07) at TIFR, February 2007.
7. *Physics Potential of INO*, Talk at "INO Meeting for Universities" Delhi, March, 2007.

Other Activities:

1. Indian Co-ordinator (along with S. Uma Sankar) for the Physics Group of the International Scoping Study for a Future neutrino Factory and Beta beam Facility
2. Member, Program Management Committee, Indian Neutrino Observatory
3. Teaching & Lecture Course: 'Electrodynamics' at HRI (Aug. - Dec.) in 2006.
4. Referee for Physical Review Letters and Pramana
5. Member, Medical, Security and Housing Allocation Committees