Neutrino-Nucleus Interactions in the Few GeV Region

Proceedings of the First International Workshop on Neutrino-Nucleus Interactions in the Few GeV Region (*NuInt01*)

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Edited by

J.G. Morfin
Fermi National Accelerator Laboratory
P.O.Box 500, Batavia, IL 60510, U.S.A.

M. Sakuda
Institute of Particle and Nuclear Studies
High Energy Accelerator Research Organization (KEK)
Oho 1-1, Tsukuba-shi, Ibaraki 305-0801, Japan

Y. Suzuki
Kamioka Observatory
Institute for Cosmic Ray Research (ICRR)
Higashi-Mozumi, Kamioka, Gifu 506-1205, Japan

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High Energy Accelerator Research Organization (KEK)
Kamioka Observatory, Institute for Cosmic Ray Research (ICRR), University of Tokyo

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* : *co-chair*
\+: *scientific secretary*

Workshop Website

http://neutrino.kek.jp/nuint01

Preface:

The early strong indication of muon-neutrino oscillations in atmospheric neutrinos by the Super-Kamiokande (SK) experiment inspired several proposals for neutrino oscillation experiments using conventional low-energy neutrino beams. By the time these indications had become the discovery of neutrino oscillations by the SK collaboration, several of the experiments were already in the construction phase. Since then, the K2K long-baseline neutrino oscillation experiment, using a neutrino beam with $\langle E\nu \rangle$ = 1.3 GeV interacting with nuclei in the Super-K detector, has already taken data for 2 years. The NuMI / MINOS project at Fermilab and the CNGS project at CERN are under construction and expecting to begin taking data within the next 2 - 4 years. These experiments are designed to improve the precision of the measurements of neutrino oscillation parameters. In addition, the short-baseline MiniBooNe experiment at Fermilab is on-schedule to begin data-taking this summer.

As these experiments accumulate increasingly-large data sets, the contribution of systematic errors will become more significant in the oscillation analysis. Important sources of these systematic errors are the uncertainty in the neutrino-nucleus cross sections and subsequent nuclear effects in the few GeV energy region such as Fermi motion, Pauli blocking, nucleon binding, nuclear correlation, shadowing, the "EMC" effect and final-state interactions. To better understand these sources as they apply to neutrino scattering will be essential for the K2K, MiniBooNe, MINOS and CNGS experiments as well as the planned neutrino oscillation experiments at JHF-Kamioka, future atmospheric neutrino experiments and next generation proton-decay experiments. Considering the above situation, the organizers believed it was a propitious time to organize an international workshop on this subject.

The Workshop has been very successful. About 68 participants, equally from Asia, US / Canada and Europe, attended this Workshop. Additional participation was arranged via international video conferencing for the presentations in the Monte Carlo session. Consequently, these Proceedings contain a very complete review of the theoretical and experimental status of neutrino-nucleus interactions in the few GeV region. The results from this Workshop are already being used and discussed in the present neutrino experiments, like K2K and NuTeV. In addition, a strong community of nuclear and high-energy physicists has been formed in order to meet the many challenges in current neutrino physics. A joint nuclear / high-energy physics proposal to experiment in the new high-intensity neutrino beams at FNAL is a good indication of the success of this venture.

To report on progress made and to re-examine the status of this field, the Second International Workshop on Neutrino-Nucleus Interactions in the few GeV Region (***NuInt02***) has now been scheduled for *December 2002* in *Irvine, California*. We hope that this Workshop will maintain its unique interest and purpose to develop the neutrino-nucleus interactions and contribute to the development of the field.

Editors of the *NuInt01* Workshop

Jorge G. Morfin

Makoto Sakuda

Yoichiro Suzuki