

WG2 introduction

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Introduction

- Present & future long-baseline ν experiments explore the full picture of neutrino oscillation:
 - ν CP asymmetry
 - Mass Hierarchy
 - θ_{23} octant
- ν -nucleus interaction cross section is dominant systematic sources
 - Nuclear model
 - CCQE-like, Resonant- π , Coherent- π , DIS, multi- π
 - $\nu e/\bar{\nu}e$ cross sections
 - Nuclear-effect, secondary interaction
 - ν_{τ} CC (ex. atmospheric ν)
 - ..., etc

WG2: Neutrino Scattering Physics

- Advent of modern, high intensity neutrino sources has produced many measurements
- Increased theoretical interest and wide range of approaches to the modern data
- Summary of experimental and theoretical efforts in Plenary #6:
 - “*Long Baseline Neutrino Nucleus Interaction Systematics*”
Daniel Cherdack
 - “*Review of experimental status of neutrino interactions*”
Jeffrey Nelson
 - “*Neutrino interactions Theory/Monte Carlo*”
Satoshi NAKAMURA
 - “*nuSTORM: Neutrino Interactions*”
Paul Soler

WG2 sessions

(include the joint session with WGs)

- We will discuss:
 - New results of ν cross section measurements
 - New theoretical approaches for interaction modeling
 - How the present Near Detectors (ND) constrain the flux and cross section uncertainties
 - Strategy of future NDs
 - On-going & new experimental approaches

New measurements

- T2K:
 - CCQE-like results
 - ν cross sections with carbon, oxygen, iron targets
- MINERvA
 - CCQE-like, nuclear effect
 - Inclusive, pion & kaon production, DIS
- NOvA
 - Inclusive CC, semi-inclusive CC π/p production, nuclear-effect, elastic ν -e scattering
 - NC coherent- π
- Tuning of event generators with ν -N scattering data
- MicroBooNE: first results!
- LArLAT: first results of π -Ar cross section!

New theoretical calculations

- Quasi-elastic production of hyperons
- Nuclear medium effects in DIS
- Isospin decomposition of $\gamma^{(*)}N \rightarrow N^*$ transition for constructing models ν -N reaction in resonance region
- Effect of neutrino mass in elastic ν -electron scattering
- Lepton production cross sections in quasi-elastic $\nu/\bar{\nu}$ -nucleus scattering

On-going exp. approaches

- ANNIE
 - Accelerator neutrino & neutron interaction measurement with Gd-doped water Č
- J-PARCT60
 - Precise measurement of ν interactions using nuclear emulsion
- DsTau
 - Tau-neutrino cross section measurement

Joint sessions with WGs

Joint sessions with WG1+2

- Impact of systematic uncertainties in oscillation measurements
- Hadron production NA61/SHINE
- T2K Near Detector constraints
- NOvA Near Detector constraints
- DUNE Near Detector
- Hyper-Kamiokande and T2K Upgrade Near Detector

Joint sessions with WG1+2+3

- NuPIL: ν -beam using pion beam for LBNF/DUNE
- MOMENT, EMuS: muon source, muon decay neutrino source in China
- ENUBET: high precision measurement ν_e cross section



**Let's enjoy new results and
fruitful discussion**

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