



Contribution ID: 462

Type: **Poster submission**

First physics run of the WAGASCI-BabyMIND detector with full setup

Thursday, August 8, 2019 10:40 AM (20 minutes)

Summary

The WAGASCI experiment aims to measure the neutrino/anti-neutrino cross-section on water, hydrocarbon and their ratio with high detection efficiency for large-angle escaping muons. This is a phase-space region that is still largely unexplored by direct measurement. We plan to acquire enough statistics to measure both flux-integrated and differential cross-sections.

The purpose of this experiment is to constrain the main non-canceling systematic error for the neutrino oscillation analysis at T2K due to neutrino cross-section uncertainties. The WAGASCI detector was devised to get around some of the shortcomings of the ND280 detector, such as low sensitivity for side and backward going muons and relatively low H₂O/CH ratio. Due to a novel 3D grid-like arrangement of scintillator strips creating water cells we achieve 4π acceptance with an 80/20 H₂O/CH ratio.

My poster, on behalf of the WAGASCI collaboration, describes in detail the new WAGASCI-BabyMIND setup. We already had a commissioning run last year with only a subset of the detectors. Aiming at the November 2019 Physics run, two side-going muon range detectors (Side MRD) and a forward-going magnetized muon spectrometer (Baby MIND) were added. Moreover, the DAQ and calibration software has been completely overhauled and improved (last year the WAGASCI detector operated with only minimal calibration).

Summary:

- Side MRDs: larger angular acceptance for outgoing muons;
- Baby MIND: charge ID for downstream muons to quantify wrong-sign backgrounds;
- 1-year data taking $>5 \times 10^{20}$ POT/year for each mode: ν & anti- ν ;
- 1.5° off-axis studies: charge current $\sigma(\text{H}_2\text{O})$, $\sigma(\text{CH})$, ratio $\sigma(\text{H}_2\text{O})/\sigma(\text{CH})$;
- Ready to take beam from November 2019;

Primary author: Mr PINTAUDI, Giorgio (Yokohama National University)

Presenter: Mr PINTAUDI, Giorgio (Yokohama National University)

Session Classification: Poster Session (Thu/Fri)

Track Classification: Neutrino Oscillations and Masses