Contribution ID: **46** Type: **not specified**

Some constraints on new physics by atmospheric neutrinos

Using the formalism by Kimura, Takamura and Yokomakura, the analytic oscillation probability is derived in the presence of new physics in propagation for high energy. While the components \epsilon_{ee}, \epsilon_{e\tau}, \epsilon_{\tau\tau} are allowed to remain relatively large (as was shown by Friedland & Lunardini), it turns out that \epsilon_{e\mu} and \epsilon_{\mu\tau} have conflict with the atmospheric neutrino data at high energy, i.e., their existence contradicts with the behavior P_{\mu\mu}=1-\sinˆ2(\Delta mˆ2L/4E). Partial analysis with \epsilon_{\mu\tau} and \epsilon_{\tau\tau} was done by G. Mitsuka at nufact08, and his result was |\epsilon_{\mu\tau}| < 0.015. Since the oscillation probability at high energy has dependence on \epsilon_{e\mu}ˆ2+\epsilon_{\mu\tau}ˆ2, it is expected that \epsilon_{e\mu} is constrained as strongly as \epsilon_{\mu\tau}, although it has to be confirmed by numerical computations. The present bound on |\epsilon_{e\mu}| is approximately 0.3, so atmospheric neutrinos appear to give us stronger constraints.

Author: Prof. YASUDA, Osamu (Tokyo Metropolitan University)

Presenter: Prof. YASUDA, Osamu (Tokyo Metropolitan University)