



ID de Contribution: 45

Type: **oral presentation**

Study Cherenkov Radiation Induced by high energy particle showers in dielectric medium

mercredi 30 juin 2010 15:10 (20 minutes)

Askaryan proposed to detect Cherenkov signals by radio wave from the negative charge excess of particle showers 50 years ago. The theory of Cherenkov pulses with Fraunhofer approximation was widely studied in last two decades. However, at high energies or for high density materials, interacting processes are suppressed by a mechanism formulated by Landau, Pomeranchuk and Migdal. The LPM effect in electromagnetic showers, For example, a 100 EeV cascade can be 100 m long has studied in few Monte Carlo simulations. The ground base radio detector experiments (e.g. RICE, AURA, and ARA) has deployed or proposed. The far field approximation was fail when the sizes of the particle showers (D) and the detection distances(L) is $L < D^2/\lambda$. We present two ab initio methods of Cherenkov pulses based on the finite-difference time-domain (FDTD) method, and modified time domain integration method of the radio signal which original proposed by arxiv:1002.3873 for far-field study. Our method provides a straightforward way of the near field calculation, which would be important for ultra high energy particle showers, especially the electromagnetic showers induced by the high energy leptons produced in the neutrino charge current interactions.

Auteur principal: M. CHEN, Chih-Ching (National Taiwan University)

Orateur: M. CHEN, Chih-Ching (National Taiwan University)

Classification de Session: Acoustic & radio, neutrino & cosmic ray detection @ South pole