

An application of the neutrino oscillation to geophysics : Study of the Earth's core composition using atmospheric neutrino

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Neutrino oscillations inside matter are sensitive to the electron density. On the other hand, neutrino absorption is sensitive to the mass density. The mass density distribution of the Earth's core is also inferred from seismic tomography. Therefore, neutrino oscillation can be used for a probe to determine the average atomic mass ratio A/Z of the Earth's core by comparing with the mass density.

The outer core composition is believed to consist of 90% iron and 10% light material, but it has not been measured yet. With the advent of the new-generation neutrino detector like Hyper-K, neutrino oscillation spectrometry will allow us to constrain directly the composition of the Earth's outer core.

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