

APR08-2008-001183

Abstract for an Invited Paper
for the APR08 Meeting of
the American Physical Society

Using neutrinos to study the earth

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Mantle convection and earthquakes are generally thought to be driven by the heat produced from uranium and thorium decays inside the earth. The KamLAND experiment has recently observed neutrinos originating from these decays, pioneering a new way to probe the earth's interior. While this measurement is consistent with earth models based on the chemical composition of meteorites and heat flow measurements on the earth's surface, it is not precise enough to constrain those models. It is interesting to note that we still know less about the nuclear reactions within the earth, just below our feet, than within the sun, an object 92 million miles away. More precise future measurements of neutrinos from the earth will have a significant impact on our understanding of the earth by constraining mantle convection and earth formation models. I will discuss my dissertation geoneutrino measurement with KamLAND, and plans for future experiments.