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Geoneutrinos (models and data)

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Geo-neutrinos, the antineutrinos from beta- decaying elements in ^{238}U , ^{232}Th chains and ^{40}K decays in the Earth, are the only reliable sources of information on the distribution and concentration of these elements in the entire planet. Their detection can shed the light on the sources of the terrestrial heat flow, on the present composition, and on the origins of the Earth.

Although geo-neutrinos were conceived long ago, a first detection of the geoneutrinos occurred very recently due to the development of large volume ultrapure liquid scintillator detectors. This year the Borexino and KamLAND had reported 99.997% C.L. for the presence of non-zero geoneutrino signal in their detected spectra, opening a new era in geophysics.

Geoneutrinos, if registered with appropriate precision, potentially can help to answer the questions regarding our planet: what is the radiogenic contribution to terrestrial heat production; what is the content of U and Th in the crust and in the mantle respectively; is there any hidden source of heat in the Earth's core, such as a geo-reactor or ^{40}K ; and, finally, is the standard geochemical model (the so called Bulk Silicate Earth model) consistent with geo-neutrino data?

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