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Earth tomography with neutrinos

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The Earth is not fully transparent to atmospheric neutrinos above the TeV scale. Since absorption depends on energy and distance traveled, studying the distribution of the multi-TeV atmospheric neutrinos crossing the Earth offers an opportunity to infer its density profile by means of only weak interactions. In this talk, I will present the first neutrino tomography of Earth using actual data (one-year of through-going muon atmospheric neutrino data collected by the IceCube telescope). In a way that is completely independent of gravitational measurements, we are able to determine geophysical properties of the Earth's interior (Earth's and core mass, moment of inertia, density profile). Our results demonstrate the feasibility of this approach to study Earth's internal structure, complementary to geophysics methods based on seismology.

Summary

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