

# New elementary probes for geosciences

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## Talk Abstract

New ways of measuring the Earth's surface and interior, using probes from naturally occurring radiation, are emerging in the XXI century, giving rise to Particle Geophysics. The characteristics of the interactions of each elementary particle with matter, govern the information that they can bring, and also our difficulty in accessing it. Muons produced by the interaction of cosmic rays in the atmosphere can travel through large amounts of rock and can be used to image and monitor the structure of volcanoes or of the subsurface when measured from underground telescopes. Neutrinos created by the same cosmic rays can only be detected in much larger dedicated observatories, but image the full planet. Lower energy neutrinos are created in radioactive decays giving a direct measurement of the global radioactive contents of the Earth. To fully interpret the data, a strong interplay between particle physicists and geoscientists is mandatory, and is increasing. We will review the global efforts in this direction, and give specific example of the ongoing projects in Portugal.

**Keywords:** Cosmic rays, muon tomography, geoneutrinos, particle geophysics.

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