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Do minerals know about Supernovae?

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Knowing the evolution of our Galaxy is a difficult task. The finiteness of the speed of light can help us on cosmological scales, but it is not helpful if we want to investigate shorter distances. Some information can be extrapolated by analyzing concentrations of radionuclides in layers of material inside the Crust, but this could give us hints just on the evolution of the Solar System and its neighborhood. Indeed, the studies on the presence of ^{60}Fe inside the Oceanic Crust point out the presence of one or multiple nearby ($O(10\,\mathrm{pc})$) and recent ($O(\mathrm{Myr})$) Supernovae. To further investigate, we propose the use of long-aged minerals, called *paleo-detectors*. Neutrinos and other astroparticles passing through paleo-detectors could generate nuclear recoils that lead to the formation of defects, defined as tracks, still visible inside the mineral. By counting the number of tracks and measuring their lengths, we obtain information on the flux of astroparticles that passed through the mineral. With this work, we analyze the discovery potential of paleo-detectors to the neutrinos emitted by past Supernovae and how they could be used to assess an evolution on the rate of nearby Supernovae.

Poster prize

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