

Luminous Solar Neutrinos

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Inelastic up-scattering of solar neutrinos during their passage through the earth can yield a flux of unstable right-handed neutrinos (RH ν s) provided their mass is relatively light ($m < 20$ MeV). These same particles can decay inside terrestrial detectors, producing visible signatures. For example if the up-scattering is mediated by a transition dipole operator the RH ν can deposit a \sim few MeV photon inside the detector. Contrary to naive expectations, over a wide range of parameter space the rate is relatively insensitive to the decay length of the RH ν , and can yield detectable signal rates orders of magnitude larger than direct detection via elastic scattering.

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