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Neutrino process with primitive meteorites and high power laser

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A huge number of neutrinos emitted in core-collapse supernova explosions (neutrino process) play an important role in stellar nucleosyntheses of rare some nuclides such as Li-7, Be-11, F-19, Nb-92, La-138, and Ta-180. The study of the neutrino process can contributes to estimation of neutrino energy spectra and explosion mechanism. In the mass region heavier than iron, only three nuclides are known as the neutrino isotopes. If we can find other candidates for neutrino production, it helps to constrain precisely the neutrino energy spectra emitted from proto-neutron stars. We have proposed the neutrino-induced reaction production of an unstable isotope of Tc-98 with a half-life of 4.2 Myr. We calculate its abundance with a supernova model coupled with calculated neutrino induced reaction cross sections involved. A key input for the calculation of the neutrino process is destruction rates by photodisintegration reactions on excited nuclei at high temperature environments. We have proposed direct measurements of photon-induced reaction cross sections on nuclei excited by high power laser to simulate stellar environments.

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