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Supernovae neutrino detection via coherent scattering off silicon nuclei

Low-energy neutrinos are clean messengers from supernovae explosions and probably carry unique insights into the process of stellar evolution. We estimate the expected number of events considering coherent elastic scattering of neutrinos off silicon nuclei, as would happen in Charge Coupled Devices (CCD) detectors. The number of expected events, integrated over a window of about 18 s, is ~ 4 if we assume 10 kg of silicon and a supernovae 1 kpc away. For a distance similar to the red supergiant Betelgeuse, the number of expected events increases to $\sim 30 - 120$, depending on the supernovae model. We argue that silicon detectors can be effective for supernovae neutrinos, and might possibly distinguish between models for certain target masses and distances.

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Primary author: FOGUEL , Ana Luisa (Universidade de São Paulo)

Co-authors: Dr FRAGA, Eduardo (Instituto de Física, UFRJ); Dr BONIFAZI, Carla (Instituto de Física, UFRJ)

Presenter: FOGUEL , Ana Luisa (Universidade de São Paulo)

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