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## Early Warning from the Detection of Pre-supernova Neutrinos in Future Large Liquid-scintillator Detectors

The detection of such pre-supernova (pre-SN) neutrinos could provide an important and independent early warning for the optical observations of core-collapse SNe. In this work, we investigate the capability of future large liquid-scintillator detectors for the early warning via the detection of pre-SN neutrinos in both  $\bar{\nu}_e + p \rightarrow e^+ + n$  and  $\nu(\bar{\nu}) + e^- \rightarrow \nu(\bar{\nu}) + e^-$  reaction channels, where  $\nu(\bar{\nu})$  denotes neutrinos (antineutrinos) of all three flavors. We propose a quantitative assessment of the capability in terms of three working criteria, namely, how far the SN distance can be covered, how long the early warning before the core collapse can be sent out, and how well the direction pointing to the SN can be determined.

### Mini-abstract

Early warning capability of pre-supernova neutrinos in future large liquid-scintillator detectors

### Experiment/Collaboration

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