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Neutrino Bursts from Type Ia and Pair-Instability Supernovae

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In addition to core-collapse, a burst of neutrinos is also expected from the other two kinds of supernovae: Type Ia supernovae (SN-Iae) and pair-instability supernoave (PISNe). The leading hypothesis is that SN-Iae are the thermonuclear explosion of a carbon-oxygen white dwarf but the exact explosion mechanism is still a matter of debate. Pair-instability supernovae are the explosions of very massive stars with carbon-oxygen cores in the range of 64 $\mathrm{M}_{\odot}$ to 133 $\mathrm{M}_{\odot}$. Observation of either a Galactic SN-Ia or PISN would be of immense value in answering the many open questions related to these events and one potentially useful source of information is the neutrino signal.

In this talk I will present expected signals from both SN-Iae and PISNe which take into account the full time and energy dependence of the emission and the flavor oscillations through the mantle of the star, as well as investigating equation-of-state and line-of-sight differences. We then use SNOwGLoBES to process the computed neutrino fluxes at Earth through five different detectors chosen to represent the range of current or near-future technologies. I will show how the neutrino signal from both SN-Iae and PISNe possess unique features that distinguish them from each other and core-collapse supernovae, how the signals can determine the explosion mechanism for SN-Iae, and, finally, how we can also determine the neutrino mass ordering if the distance to the event is known.

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