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High-Energy Neutrinos from Supernovae

Sunday, 16 June 2019 13:30 (15 minutes)

Neutrinos from supernovae (SNe) are crucial probes of explosive phenomena at the deaths of massive stars and neutrino physics and high-energy neutrinos are produced through hadronic processes by cosmic rays. We point out that IceCube and KM3Net can detect about 100-1000 events from a SN II-P (and >100,000 events from a SN IIn) at a distance of 10 kpc. We provide new quantitative predictions of time-dependent high-energy neutrino emission from diverse types of SNe, which enable us to critically optimize the time window for dedicated searches for nearby SNe. A successful detection will give us a multienergy neutrino and multimessenger view of SN physics and new opportunities to study neutrino properties, as well as clues to the cosmic-ray origin.

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