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Observability of Neutrinos from Failed Supernovae and Black Hole-Neutron Star Mergers JASON LIANG, HALSTON LIM, North Carolina School of Science and Mathematics, KATE SCHOLBERG, Duke University — Neutrino astronomy is an indispensable tool for studying astrophysical phenomena such as failed supernovae (fSN) and black hole-neutron star mergers (BHNSM) and would allow for the observation of black hole and short-period GRB formation. We conducted a comprehensive study of the observability of neutrinos from fSN and BHNSM in future and proposed detectors that incorporates realistic detector responses. SNOwGLoBES, event calculation software that takes into account fluxes, cross sections, detector smearing, and post-smearing efficiencies, was utilized. For fSN and BHNSM, we determined the flux of each neutrino flavor and calculated the observed neutrino spectrum in various detectors as a function of distance. Additionally, for the fSN we generated time dependent models of the neutrino signal up until black hole formation. Our results indicate that observation of neutrinos from fSN and BHNSM in the galactic neighborhood is very feasible. In addition, the neutrino signals are distinguishable from the signal produced by typical SN, which has future implications for the study of the origin of high energy astrophysical neutrinos.

Jason Liang
North Carolina School of Science and Mathematics

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