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Study Of EoS Dependence of SNe via Relic Supernova Neutrino Spectrum

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Energy spectrum of relic supernova neutrinos (RSNs) tells us valuable information about cosmic core-collapsed SNe as neutrino sources and their cosmological evolution. Recent astronomical observations and theoretical studies of SNe give new insights on stellar evolution, which also influence supernova explosion mechanism. RSN energy spectrum is an important tool to investigate interesting consequences of these new findings. We show our results of RSN spectrum [3,4] based on two astronomical problems, the supernova rate [1] and the red supergiant problem [2] . They reveal the signature of nuclear EoS dependence for SNe models. The cosmological galaxy evolution, the star formation history, and metallicity dependence of SNe are all connected each other, and they have an influence on RSN spectrum in terms of how SNe explode. We also discuss these issues..

[1] S. Horiuchi et al., Phys. Rev. D, 79, 0830138 (2009)
[2] S. J. Smartt, PASA, 32, 16 (2015)
[3] G. J. Mathews et al., ApJ, 790, 115 (2014)
[4] J. Hidaka et al., ApJ, 827, 6 (2016)

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