Detectability of the Supernova Relic Neutrinos

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We investigate the flux and the event rate of the supernova relic neutrino background (SRN) at the SuperKamiokande detector for various neutrino oscillation models with parameters inferred from recent experimental results. A realistic model of neutrino emission from supernova explosions and several models of the cosmic star formation history are adopted in the calculation. The number flux over entire energy range is found to be $11 - 15$ cm^{-2}s^{-1}. We discuss the detection possibility of SRN at SuperKamiokande, comparing this SRN flux with other background neutrinos in more detail than previous studies. Even though there is no energy window in which SRN is dominant, we might detect it as the distortion of the other background event. We found in the energy range $17 - 25$ MeV the expected event rate at SuperKamiokande $0.4 - 0.8$ yr^{-1}. In this range, ten-year observation might enable us to detect SRN signal (at one sigma level) in the case of LMA solar neutrino solution. We also investigate event rate at SNO and KamLAND. Although we can find energy window, the expected event rate is rather small (0.03 yr^{-1} for SNO, 0.1 yr^{-1} for KamLAND).