

N12a **超新星後期ニュートリノ放射の解析解**

諏訪雄大（東京大学/京都大学），原田了（理化学研究所），中里健一郎（九州大学），住吉光介（沼津工業高等専門学校）

Neutrinos are a guaranteed signal from supernova explosions in the Milky Way, and a most valuable messenger that can provide us with information about the deepest parts of supernovae. In particular, neutrinos will provide us with physical quantities, such as the radius and mass of protoneutron stars (PNS), which are the central engine of supernovae. This requires a theoretical model that connects observables such as neutrino luminosity and average energy with physical quantities. Here, we show analytic solutions for the neutrino-light curve derived from the neutrino radiation transport equation by employing the diffusion approximation and the analytic density solution of the hydrostatic equation for a PNS. The neutrino luminosity and the average energy as functions of time are explicitly presented, with dependence on PNS mass, radius, the total energy of neutrinos, surface density, and opacity. The analytic solutions provide good representations of the numerical models from a few seconds after the explosion and allow a rough estimate of these physical quantities to be made from observational data.