User's Guide for Supernova Relic Neutrino Background

— on the basis of the metallicity evolution of galaxies —

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Abstract

This is a guide for users of flux data tables for supernova relic neutrino background.

1 Introduction

The models of supernova relic neutrino (SRN) flux from past stellar collapses including black hole formation (failed supernovae) are constructed on the basis of the metallicity evolution of galaxies. The dependences of SRNs on the cosmic star formation rate density, shock revival time and equation of state are considered and, here, we provide the results for the reference model and models with maximum and minimum values of SRN event rate among models investigated. For details on our model, please see in our original paper [1]. For the neutrino spectra emitted from various progenitors, we utilize the Supernova Neutrino Database [2]. **Please reference them when you publish scientific articles using our data.**

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2 Flux data

2.1 Data arrangement

The data is presented in the following order, in all files.

1. Neutrino energy: E_ν [MeV]

2. Differential number flux of SRNs in the unit of second: $\dfrac{\mathrm{d}F(E_\nu)}{\mathrm{d}E_\nu}$ [cm^{-2} s^{-1} MeV^{-1}]

3. Differential number flux of SRNs in the unit of year: $\dfrac{\mathrm{d}F(E_\nu)}{\mathrm{d}E_\nu}$ [cm^{-2} year^{-1} MeV^{-1}]

2.2 All flavors for the case without neutrino oscillation

The flux data of SRNs with ν_e, $\bar{\nu}_e$, and ν_x $(= \nu_\mu = \bar{\nu}_\mu = \nu_\tau = \bar{\nu}_\tau)$ for the case without neutrino oscillation are named `srnAAABwo.data` with

- `AAA` is a name of model: `ref` for the reference model and `max` and `min` for models with maximum and minimum values of SRN event rate among models investigated, respectively

- `B` represents a flavor: `1`, `2` and `3` for ν_e, $\bar{\nu}_e$, and ν_x, respectively

For the details of models `ref`, `max` and `min`, please see in our original paper [1].

2.3 $\bar{\nu}_e$ for the case with neutrino oscillation (adiabatic MSW effect)

The flux data of SRNs with $\bar{\nu}_e$ for the case without neutrino oscillation are named `srnAAA2CC.data` with

- `AAA` is a name of model: `ref` for the reference model and `max` and `min` for models with maximum and minimum values of SRN event rate among models investigated, respectively

- `CC` represents the mass hierarchy: `nh` and `ih` for the normal and inverted mass hierarchies, respectively

For the details of assumption of neutrino oscillation (adiabatic MSW flavor conversion), please see in our original paper [1].

3 Contact

If you find some strange problem, please contact us. We would appreciate it very much if you could give us comments or suggestions on the tables. The correspondence address is

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References

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