Detector Simulation using Supernova Models for the Supernova Burst Alert by Super-Kamiokande The University of Tokyo, ICRR, Sekiya Lab. M1 Yuri Kashiwagi

Abstract

Super-Kamiokande (SK) has a **Supernova Burst Alert System**^[1] called "SN Watch". After Gd loading with 0.01% concentration, SK's pointing accuracy for a supernova (SN) at 10kpc has been improved from 5° to 4°. To make the system more functional, I have been working to demonstrate the system with simulations including as many supernova models as possible.



Method: Data format normalization

- Simulation data of SN models are provided in different data format.
- Current system is compatible with the format of Nakazato model^[2].
- To incorporate other models into the system, we arrange the values in the provided data tables into the same order as Nakazato model's data table. (normalization)

- the result of event rate calculation is different from expected one. We have been investigating the problem to find and correct the mistake.

- Wilson model is expected to be correctly included in SN Watch in this month.
- [1] Abe, K., et al. Astropart. Phys. 81 (2016): 39-48.
 - [2] Nakazato, K., et al. *ApJS* 205.1 (2013): 2.



• We began the normalization with **Wilson model**^[3]. Still struggling to produce "machine readable"

• Supernova model Simulation calculates number of event for inverse beta decay number of event for elastic scattering

Different result from expectation! (Larger number of event than expected.)

Green should overlap with **Red**, but it is not. • The cause is likely to lie in:

reading part of the normalized data table of Wilson model

event number calculation

• We have been working on to fix the problem. • Once we succeed to solve this problem, the incorporation of other models will go smoothly.