Contribution ID: **131** Type: **Poster**

Synthesis of Sc, Ti, and V in Core-Collapse Supernovae toward Constraining the Explosion Mechanism

Monday, 9 September 2024 16:42 (1 minute)

A core-collapse supernova (CCSN) is an explosive phenomenon that occurs at the end of the life of a massive star and drives the chemical evolution of the Universe by providing metals. However, the explosion mechanism has not yet been fully understood. In this study, we utilize nucleosynthesis to investigate the explosion mechanism. Metal-poor stars are low-mass stars formed in the early Universe. Their chemical abundances reflect the result of explosive nucleosynthesis in the CCSN of first stars. Recently observations of metal-poor stars identify correlations among Sc, Ti, and V. The abundances of Sc, Ti, and V in metal-poor stars, however, have not been reproduced by CCSN nucleosynthesis based on the results of hydrodynamical simulation. This can be a clue to constrain the explosion mechanism. Therefore, (1) we perform nucleosynthesis simulations with arbitrary temperature, density, and neutrino flux to find physical conditions reproducing the chemical abundance of metal-poor stars, and (2) we conduct two-dimensional neutrino-hydrodynamical simulation to examine whether the physical conditions are realized in the CCSN explosions. As a result, we identify the conditions on temperature and neutrino flux but find that these conditions are not realized simultaneously in 2D simulations. In this presentation, we introduce the results of (1) and (2) and discuss how the required conditions are satisfied in the CCSN explosions.

Primary author: HATAMI, Ryota (SOKENDAI/NAOJ)

Presenter: HATAMI, Ryota (SOKENDAI/NAOJ)

Session Classification: Poster presentation