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Origins of light trans-Fe and r-process elements deduced from Galactic chemical evolution YUHRI ISHIMARU, Department of Material Science, International Christian University, SACHIE ARAO, Graduate School of Arts and Sciences, International Christian University, SHINYA WANAJO, RIKEN, iTHES Research Group, NICOLAS PRANTZOS, l'Institut d'Astrophysique de Paris
— Compact binary mergers are suggested to be the major site of the r-process elements by recent hydrodynamical and nucleosynthesis studies. It has been pointed out, however, that estimated long lifetimes of compact binaries are in conflict with the presence of large scatters in r-process elements of very metal-poor stars (MPS). To resolve this problem, we examine the role of compact binary mergers in the early Galactic chemical evolution on the assumption that our Galactic halo was formed from clusterings of sub-halos. We find that star-to-star scatters of [r/Fe] in MPS can be well explained with this scenario. Observations of MPS also show large enhancement of Sr relative to Ba, suggesting a distinct site of light trans-Fe elements. Recent nucleosynthesis studies show that electron-capture supernovae (ECSNe) can produce heavy elements up to Zr (Wanajo et al. 2011). Using our inhomogeneous chemical evolution model, we discuss that ECSNe can explain observed enhancement of Zn in MPS as well as of Sr, Y, and Zr.

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