TYPE IC CORE-COLLAPSE SUPERNOVAE EVOLVED FROM VERY MASSIVE STARS

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Very massive stars, of which initial mass is more than about 100 solar-mass, have been recently found in young high-mass clusters [1]. This observational evidence indicates the existence of very massive stars during galactic chemical evolution. Since mass loss is less effective for metal-poor stars, metal-poor very massive stars may end their lives as pair-instability (PI) supernovae (SNe) or pulsational pair-instability (PPI) SNe. The possibility of PI SNe or PPI SNe was pointed out in some super-luminous SNe such as SN 2007bi [2]. In this study, we investigate the explosive nucleosynthesis of energetic aspherical core-collapse SNe evolved from very massive stars [3]. The very massive star models have the initial mass of 110 and 250 solar-mass and the metallicity of 0.2 times to the solar value. The final masses of these stars are 43.1 and 61.1 solar-mass. The 250 solar-mass model becomes PPI at the beginning of the O-burning. Then, we performed 2D hydrodynamical simulations of energetic aspherical SN explosions. The energetic supernovae with an explosion energy of 50-70 foe for these two models produced 3.7-6.2 solar-mass of ^{56}Ni. The obtained yield reproduces the ^{56}Ni amount evaluated from spectrum analyses and the light-curve observations of SN 2007bi. We obtained large velocity dispersions of the ejected amounts of O, Si, Ca, and Fe in the aspherical explosion models. We will discuss some details of PPI of the 250 solar-mass model.

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