[포ST-07] Effect of Overshooting on Final Masses of Type Ibc Supernova Progenitors

Wonseok Chun, Sung-Chul Yoon
Department of physics and Astronomy, Seoul National University

Helium mass in the envelope is one of the most important properties in progenitors of type Ib/c supernovae (SNe Ib/c), since SN Ib/c progenitors are distinguished by the presence of He I lines. However, previous progenitor models do not reproduce the required He mass limit($M_{\rm He} < 0.14 {\rm M}_{\odot}$) suggested by a spectroscopic analysis of SN Ib/c.

In this work, we investigated the effect of overshooting on the evolution of pure helium stars, focusing on the final He mass in the envelope, $M_{\rm He,f}$. We used the MESA code to calculate single helium star models with the initial masses of $M_{\rm init} = 5 \sim 30 {\rm M}_{\odot}$, $Z = 0.02, 0.04$ and overshooting parameters of $f_{\rm ov} = 0 \sim 0.4$. The final He mass $M_{\rm He,f}$ decreases as $f_{\rm ov}$ increases, due to larger burning core compared to weak overshooting models. Dependence of the final mass $M_{\rm He,f}$ on overshooting is strongest for models with $M_{\rm init} = 7 \sim 10 {\rm M}_{\odot}$, and this effect originates from accelerated mass loss during transition between WNE and WC/O phase. However, $M_{\rm He,f}$ exceeds $0.27 {\rm M}_{\odot}$ for all models, which still doesn't meet the criteria of $M_{\rm He} < 0.14 {\rm M}_{\odot}$. This implies that mass loss during the post helium burning phase must be enhanced dramatically compared to what the standard models predict.

[포ST-08] Accretion Flow and Disparate Profiles of Raman Scattered O VIλλ1032 and 1038 in the Symbiotic Star V1016 Cygni

Jeong-Eun Heo, Hee-Won Lee
Department of Astronomy and Space Science, Sejong University

The symbiotic star V1016 Cygni shows the Raman scattered O VI features at 6825 Å and 7088 Å. These are formed through inelastic scattering of O VI 1032, 1038 by atomic hydrogen. They exhibit characteristic double peak profiles with a stronger red peak, which is explained by the accretion flow around the white dwarf. In addition, the two Raman features have different profiles in such a way that the blue part of the Raman 7088 feature is relatively more suppressed than the Raman 6825 counterpart. We produced the Doppler maps of the two Raman features in order to trace the origin of the disparate profiles. We conclude that the profile difference is due to various O VI 1032 to O VI 1038 flux ratios in the accretion region. This is consistent with the picture where the slow stellar wind from the giant interacts with the accretion flow around the white dwarf.