

THE CHEMICAL EVOLUTION OF THE MAIN COMPONENT OF THE BINARY SYSTEM ν SAGITTARII

V. LEUSHIN

Special Astrophysical Observatory of RAS, Russia
leushin@sci.lpi.msk.su

V. CHUVENKOV

Rostov State University, Russia
chuvencov@phys.rmd.runnet.ru

AND

L. SNEZHKO

Special Astrophysical Observatory of RAS, Russia

A model of internal structure and evolution of the peculiar binary system ν Sgr is presented. The model corresponds well to the observed chemical composition of the main component atmosphere (10^{-4} H, 0.844 He, 0.013 C, 0.042 N by mass). It is supposed that about 5 million years ago the main component passed the stage of hydrogen nuclear burning in the shell over the helium core where the helium-carbon reactions took place. Because of convective mixing, the synthesized carbon diffusing into the hydrogen burning zone was catalyzing the reactions of the CN – cycle. This has resulted in anomalies in the chemical composition, particularly high nitrogen abundance in the layer observed now as the atmosphere of the main component since external layers were thrown off during the evolution. Following the calculated results, the quantitative restrictions of temperature and density in the layers and values of mixing parameters are obtained. It is shown that the best agreement with observations exists if the mass of the matter penetrating from the zone of helium-carbon reactions into the helium layer is 0.25 of the helium-carbon core mass. Moreover, the ratio of mass concentration He/C in this matter should equal 2, and the mass share diffusing into the layer of hydrogen burning should be in the range 0.25 - 0.30 of the layer mass.