

High Resolution Spectroscopic Observation of the Symbiotic Star V1016 Cyg Using BOES and the Formation of Broad H α Wings

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We present our high resolution spectrum of the symbiotic star V1016 Cyg obtained with the BOES(Bohyunsan Optical Echelle Spectrograph) installed on the 1.8m telescope at Mt. Bohyun. We investigate the broad H α wings and the HeII Raman scattered 6545Å feature using the previous Raman scattering model augmented with the input far UV spectrum retrieved from the FUES data archive. The HeII 1025 emission, which is responsible for the formation of the 6545 feature via Raman scattering, is heavily absorbed but reliably inferred from other HeII emission lines using case B recombination theory provided by Hummer & Storey (1995). By interpolating the FUSE data from regions with minimal interstellar extinction, we also infer the continuum level around Ly β which is, in turn, incident upon the neutral scattering region to form H α wings through Raman scattering. It is found that, in the presence of a neutral scattering region with N_{HI} exceeding 10^{20}cm^{-2} , we may obtain simulated H α wings and the HeII 6545 Raman feature, which are consistent with our BOES data. From our combined analysis of BOES and FUSE data, we tentatively propose that the neutral scattering region around the giant component may be exposed to stronger far UV continuum radiation than is directed to the observer's line of sight.