Modeling the light curve of V445 Puppis: Helium nova on a massive white dwarf

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V445 Pup is an unique object that is identified as a helium nova. In the earlier work (2003) we presented theoretical light curve models based on the blackbody emission which includes the best fit model of a very massive white dwarf ($> 1.3M_{\odot}$) with a short distance (< 1 kpc). However, recent report on spectral analysis by Iijima demonstrates the presence of the absorption lines of Na I D at the velocity of 16.0 and 73.5 km s^{-1}, suggesting a much larger distance of > 3 kpc. Also the color indexes during the outburst reported to VSOLJ are consistent with free-free emission. With these new observational aspects I have revised the light curve model of V445 Pup based on the free-free emission from just outside of the photosphere. The nova evolution is calculated using the optically thick wind theory. The theoretical light curve fittings show a good agreement only with very massive white dwarfs ($> 1.35M_{\odot}$). Also our light curves are consistent with a long distance such as $3 - 6$ kpc. During the outburst, a part of the accreted matter is blown off by the wind and the rest remained on the white dwarf. The accumulation efficiency of the accreted matter is estimated to be $>\sim 50\%$. This suggests that the white dwarf mass is increased after the one cycle of the helium shell flash. Therefore, V445 Pup is a strong candidate of Type Ia supernova progenitor.