

W36a Disk wind models reproduce the optical spectra of a dwarf nova V455 And

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Cataclysmic variables (CVs) are an accreting white dwarf system in a close binary. The high-state CVs, namely nova-like (NL) stars and dwarf novae (DNe) in outbursts show P-Cygni profiles in their UV spectra, which are interpreted as a bi-conical disk wind with the typical wind mass-loss to disk accretion rate ratio of $\leq 10\%$. Recently, for the first time, Tambo et al. (2022) discovered the strong but single-peaked Balmer and He II 4686 emission lines during the outburst of an eclipsing DN V455 And. They discussed that an accretion disk cannot produce such an emission profile, but the most promising origin is disk winds.

In this talk, we present our spectral synthesis calculations using the Monte Carlo radiative transfer and ionization simulation code PYTHON (Long & Knigge 2002). Our calculations with the disk wind models implemented from the UV and optical spectra of NLs, however, cannot reproduce the optical spectra of V455 And around the outburst maximum. Instead, more optically-thick disk winds with either (1) the wind mass-loss to accretion rate ratio of 40%, or (2) a clumpy wind structure similar to stellar winds, are required to achieve the emission line fluxes and profiles of the observed spectra. Moreover, the simulated spectra using the V455 And wind models but for lower-inclination cases show the UV and optical spectra resembling NLs with clear wind features, suggesting that such optically-thick winds are not unique to the DN V455 And but may also exist in, at least, some NLs.