

First detection of two superoutbursts during the rebrightening phase of a WZ Sge-Type dwarf nova: TCP J21040470+4631129

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Abstract

© 2020 The Author(s) 2020. Published by Oxford University Press on behalf of the Astronomical Society of Japan. We report on photometric and spectroscopic observations and analysis of the 2019 superoutburst of TCP J21040470+4631129. This object showed a 9 mag superoutburst with early superhumps and ordinary superhumps, which are the features of WZ Sge-Type dwarf novae. Five rebrightenings were observed after the main superoutburst. The spectra during the post-superoutburst stage showed Balmer, He i, and possible sodium doublet features. The mass ratio is derived as 0.0880(9) from the period of the superhump. During the third and fifth rebrightenings, growing superhumps and superoutbursts were observed, which have never been detected during a rebrightening phase among WZ Sge-Type dwarf novae with multiple rebrightenings. To induce a superoutburst during the brightening phase, the accretion disk needs to have expanded beyond the 3: 1 resonance radius of the system again after the main superoutburst. These peculiar phenomena can be explained by the enhanced viscosity and large radius of the accretion disk suggested by the higher luminosity and the presence of late-stage superhumps during the post-superoutburst stage, plus by more mass supply from the cool mass reservoir and/or from the secondary because of the enhanced mass transfer than those of other WZ Sge-Type dwarf novae.

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Keywords

accretion, accretion disk, novae, cataclysmic variables, stars: dwarf novae, stars: individual (TCP J21040470+4631129)

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