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Survey of period variations of superhumps in SU UMa-type dwarf novae. VII. the seventh year (2014-2015)

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Abstract

© The Author 2015. Published by Oxford University Press on behalf of the Astronomical Society of Japan. All rights reserved. Continuing the project described by Kato et al. (2009, PASJ, 61, S395), we collected times of superhump maxima for 102 SU UMa-type dwarf novae, observed mainly during the 2014-2015 season, and characterized these objects. Our project has greatly improved the statistics of the distribution of orbital periods, which is a good approximation of the distribution of cataclysmic variables at the terminal evolutionary stage, and has confirmed the presence of a period minimum at a period of 0.053 d and a period spike just above this period. The number density monotonically decreased toward the longer period and there was no strong indication of a period gap. We detected possible negative superhumps in Z Cha. It is possible that normal outbursts are also suppressed by the presence of a disk tilt in this system. There was no indication of enhanced orbital humps just preceding the superoutburst, and this result favors the thermal-tidal disk instability as the origin of superoutbursts. We detected superhumps in three AM CVn-type dwarf novae. Our observations and recent other detections suggest that 8% of objects showing dwarf nova-type outbursts are AM CVn-type objects. AM CVn-type objects and EI Psc-type objects may be more abundant than previously recognized. OT J213806, a WZ Sge-type object, exhibited remarkably different features between the 2010 and 2014 superoutbursts. Although the 2014 superoutburst was much fainter, the plateau phase was shorter than the 2010 one, and the course of the rebrightening phase was similar. This object indicates that the O - C diagrams of superhumps can indeed be variable, at least in WZ Sge-type objects. Four deeply eclipsing SU UMa-type dwarf novae (ASASSN-13cx, ASASSN-14ag, ASASSN-15bu, and NSV 4618) were identified. We studied long-term trends in supercycles in MM Hya and CY UMa and found systematic variations of supercycles of ~20%.

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Keywords

accretion, accretion disks, novae, cataclysmic variables, stars: dwarf novae