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Disk precession and quasi-periodic brightness oscillations of V603 Aql in 2001-2002

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Abstract

We present the photometric observations of the old nova V603 Aql with the RTT 150 Russian-Turkish telescope during eleven nights of 2001-2002. We show that the star at this time was in a state with positive superhumps and its photometric period of 0.d1440.d145 was longer than the orbital period. We found night-to-night variations in the mean brightness of the system that are consistent with disk precession periods of 3.d3 and 3.d0 in 2001 and 2002, respectively. Analysis of the results and their comparison with the results of other authors using current theoretical models for disk precession lead us to suggest that the change in the disk precession period was caused by a change in the accretion rate in the system. V603 Aql in a state with negative superhumps was found to be brighter than it is in a state with positive superhumps by 0.m2-0.m3. We hypothesize that the transition between these states could also be caused by a change in the accretion rate. Quasi-periodic oscillations (QPOs) of the brightness with typical time scales of 9-70 min were detected on each observing night. These time scales were found to change from night to night. The detection of QPOs with a period of about 0.05 of the orbital period and its multiples on certain nights provides evidence for the model of QPO generation through accretion-rate modulation by ionization-front oscillations on the surface of the donor star near the inner Lagrangian point. © 2004 MAIK "Nauka/Interperiodica".

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Keywords

Cataclysmic variables, Photometry