THE ULTRASHORT PERIOD DWARF NOVA SW URSAE MAJORIS

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ABSTRACT. SW UMa is an unusual dwarf nova in several respects. Recent observations by Robinson *et al.* (1986) have established that SW UMa is an SU UMa system, while Shafter, Szkody, and Thorstensen (1986) have presented evidence suggesting that SW UMa may be a DQ Her system as well. If the DQ Her classification is confirmed then SW UMa will be the only system to have this dual classification. Finally, time resolved spectroscopy of SW UMa has revealed the presence of an S-wave component in the Hα emission which has an unexpected phasing relative to the line wings.

1. THE SU UMA CLASSIFICATION

In March of 1986 SW UMa had a long and bright eruption (amplitude ~7 mag., duration ~3 weeks). Photometric observations by Robinson *et al.* (1986) during this eruption revealed superhumps with a period of 84.0 minutes, which is 2.7% longer than 81.8 minute orbital period (Shafter, Szkody, and Thorstensen 1986). These observations established that the eruption was a superoutburst and that SW UMa is a SU UMa system. The superhumps did not develop until 7-10 days after maximum light and persisted for a little more than a week. In addition to the superhumps, quasi-periodic oscillations with a period of ~5 minutes appeared in the light curve two weeks after maximum. A detailed discussion of the SU UMa classification will be presented in Robinson *et al.* (1986).

2. THE DQ HER CLASSIFICATION

High-speed optical photometric observations have, on two separate occasions, revealed the presence of a 15.9 minute modulation in the quiescent light curve of SW UMa. Our observations have not allowed us to determine if the 15.9 min oscillation is strictly periodic. However, a 2.5 hr series of X-ray observations obtained with EXOSAT also revealed a modulation when the data were folded at the 15.9 minute period. Future photometric observations should attempt to confirm the 15.9 minute periodicity. If the

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15.9 minute modulation reflects the rotation period of the white dwarf then future observations may also reveal a 19.7 minute beat period between the white dwarf rotation period and the 81.8 minute orbital period.

3. THE S-WAVE COMPONENT

In the standard model of cataclysmic variables the excess emission giving rise to the S-wave component is believed to be formed in the vicinity of the hot-spot where the interstar mass transfer stream impacts the accretion disk. In SW UMa, however, the phasing of the S-wave component suggests that the excess emission is produced in a region of the disk *opposite* to the expected location of the hot-spot. Optical photometric and X-ray observations also suggest that excess continuum radiation is also being produced in this same region of the disk.

A thorough discussion of the anamoulous phasing of the S-wave component will be presented in Shafter, Szkody, and Thorstensen (1986). It is worth mentioning that several other ultrashort period systems also exhibit anamoulous S-wave phasings. They include HT Cas (Young, Schneider, and Schectman 1981), T Leo (Shafter and Szkody 1984), and WZ Sge (Gilliland, Kemper, and Suntzeff 1986).

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