NOVA CYGNI 1975 : A MODEL FOR THE VARIABILITY OF THE 3 HOUR PERIOD

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A periodic modulation in the optical flux from Nova Cygni 1975 has been observed since shortly after outburst (Tempesti 1975) and the period is known to have varied by at least a few percent (Semeniuk et al. 1976). We account for the modulation in terms of a simple geometrical model in which the wind emanating from the nova is shadowed by its binary companion (see Fabian and Pringle 1977 for a fuller account). This produces an azimuthal variation in the radius of the surface of last scattering, R_s, which an observer sees as a periodic modulation of the continuum with period roughly equal to the orbital period. Variation of the observed period is accounted for in terms of variation of the size of R_s.

References

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Semeniuk, I., Kruszewski, A. and Schwarzenberg - Czerny, A., 1976, Inf. Bull. Var. Stars No. 1157.

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D I S C U S S I O N of paper by FABIAN and PRINGLE:

BASCHEK: If the system is imbedded in an electron scattering sphere wouldn't one expect a considerable smearing out of the spectral features so that narrow observed features had to be formed outside the scatter sphere?

PRINGLE: Yes, the continuum spectrum is formed well within the scatter sphere but of course line features must be formed outside that radius.

SHAVIV: Do you assume the radiation inside the tube to be in thermal equilibrium, i.e., the radiation in the vacuum in equilibrium with the matter outside?

PRINGLE: Yes. That is why the evacuated tube, once it has filled with photons so that the pressures are almost equal, only closes up at the thermal velocity of the particles which is much less than the full (radiation pressure) sound speed.

SMAK: 1. Can you explain why we don't see the eclipses?

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2. Do I understand correctly that the light variations are due to the fact that the system looks fainter when we look at a place where the tube intersects the scattering sphere?

PRINGLE: 1. The surface of last scattering is much bigger than the binary separation, so we do not expect eclipses until the two distances become comparable.

2. When the tube intersects the scatter sphere we see deeper into the envelope and so expect the system to appear brighter.

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