

Search for δ Scuti Type Pulsating Components in Eclipsing Binary Systems

S.-L. Kim, J. W. Lee, J.-H. Youn, H.-K. Moon, K. J. Choo

Korea Astronomy Observatory, Taejon, 305-348, Korea

Abstract. We present observational results of four eclipsing binary stars, Y Cam, RZ Cas, AS Eri and RU UMi, which were reported to have δ Scuti type pulsating components.

δ Scuti type pulsating components discovered in eclipsing binary systems are very attractive observing targets from an asteroseismological point of view, because they allow for the independent determination of masses and radii for each component. Nevertheless, few such stars have been reported so far and, furthermore, only two stars, AB Cas and Y Cam, have been studied in depth (Lampens & Boffin 2000 for a recent review). This is probably due to their too small amplitude oscillation features in comparison with large amplitude eclipsing phenomena.

We present preliminary CCD photometric results for a known eclipsing binary with a pulsating component, Y Cam, and three recently reported candidates, RZ Cas, AS Eri and RU UMi. The observations were done with a PM512 CCD camera attached to the 61cm telescope at Sobaeksan Optical Astronomy Observatory (SOAO) in Korea. Instrumental magnitudes were obtained using the ADPS (Automatized Differential Photometry System; Park 1993). In order to detect high frequencies resulting from pulsations, we subtracted low frequencies caused by orbital motions using the polynomial fitting technique. Light curves of two stars, Y Cam and RZ Cas, are shown in Figure 1, and our results are summarized in Table 1. We confirmed the previous results for three stars, Y Cam, RZ Cas and AS Eri. However, we could not find a definite oscillating frequency for RU UMi. Its pulsating features are thought to be uncertain.

We will start an observational survey program to search for δ Scuti type pulsating components in eclipsing binary systems after February 2001, using the SOAO 61cm telescope and the 2K SITE CCD camera (FOV of $20'5 \times 20'5$).

References

- Broglia, P., & Conconi, P. 1984, *A&A*, 138, 443
Gamarova, A. Yu., Mkrtichian, D. E., & Kusakin, A. V. 2000, *IBVS*, no.4837
Lacorte, M. B., & Van Hamme, W. V. 1999, *AAS*, 195, 7615
Lampens, P., & Boffin, H. M. J. 2000, *Delta Scuti and related stars*, ASP conf. series, vol. 210, 309
Ohshima, O., Narusawa, S.-Y., Akazawa, H., Fujii, M., Kawabata, T., & Ohkura, N. 1998, *IBVS*, no.4581
Park, N.-K. 1993, *Publications of the Korean Astronomical Society*, 8, 185

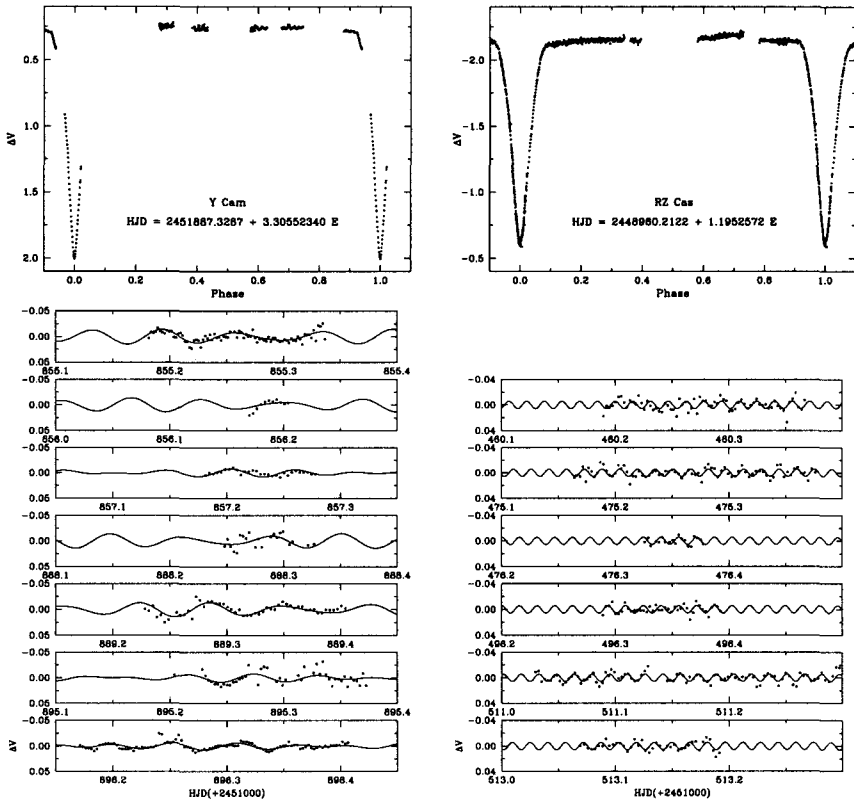


Figure 1. (Top) Phase diagram of two eclipsing binary stars, Y Cam (left) and RZ Cas (right). (Bottom) Light variations of pulsating components in these two stars, using the out-of-eclipse data.

Table 1. Basic parameters of four variable stars.

Name	V Sp. Type	$\dagger P_{pulsating}$ $P_{eclipsing}$	$\ddagger A_{pulsating}$ $A_{eclipsing}$	Previous results Reference
Y Cam	10 ^m 50 A8 V	0 ^d 0664 3 ^d 30552340	\sim 0 ^m 03 1 ^m 74	0 ^d 0664 (15.05 c/d) Broglia & Conconi 1984
RZ Cas	6 ^m 18 A2.8 V	0 ^d 0156 1 ^d 1952572	\sim 0 ^m 02 1 ^m 54	0 ^d 0156 (64.20 c/d) Ohshima et al. 1998
AS Eri	8 ^m 29 A3 V	0 ^d 0172 2 ^d 664152	\sim 0 ^m 01 0 ^m 71	0 ^d 0169 (59.03 c/d) Gamarova et al. 2000
RU UMi	10 ^m 00 F5	0 ^d 0269 (?) 0 ^d 52492599	\leq 0 ^m 01 0 ^m 66	0 ^d 0194 (51.43 c/d) Lacorte & Van Hamme 1999

\dagger : period, \ddagger : amplitude