ISOPHOT OBSERVATIONS OF THE RS CVN -TYPE STAR
HR 7428

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The analysis of the spectral energy distribution in the optical, near infrared and IRAS bandpasses has shown that infrared excess in RS CVn-type binaries can be attributed to the presence of circumstellar matter shells (Lazaro 1988, Sealtriti et al. 1993 and references therein). Many RS CVn-type binaries have been detected by IRAS at 12, 25, and 60 $\mu$m. Only HR 7428 (8-HD 184398) has been detected at 100 $\mu$m.

We selected a sample of RS CVn sources to be observed by ISO, following the indication given by IRAS on the presence of IR excess. In this paper we report on preliminary data obtained for HR 7428 that is a spectroscopic binary (K2 II-III + A2 V) with orbital period of 108.8 days.

1. Observations and results

ISO observed HR 7428 with ISOPHOT on Oct 20, 1996. The PHT-P and PHT-C detectors were used to obtain photometric data at 3.6, 10, 25, 50, 100, 135, and 200 $\mu$m. Spectrophotometric measurements with resolution $\lambda/\Delta\lambda \sim 90$ in the 2.5 - 12 $\mu$m interval were acquired with PHT-SS and PHT-SL detectors. The spectrophotometric data have been flux calibrated by using the flux measurements at 3.6 and 10 $\mu$m obtained by PHT-P1, for the two intervals 2.5-5 $\mu$m and 6-12 $\mu$m, respectively. The data here given cannot be considered as final, being the result of the standard reduction process (pipeline 5.1) not yet scientifically validated.

Contemporary with ISO observations, we observed HR 7428 in the optical and near infrared at Catania Astrophysical Observatory: i) in UBV with an 80-cm automatic telescope, between Oct 11 and 28; and ii) in JHK

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with the 91-cm telescope, on Oct 17 and 18. We adopted the ephemeris HJD=2445062.88+108.854×E (Strassmeier et al. 1993) to compute the orbital phases.

The UBV data were obtained between phases 0.8 and 0.9. No variability was detected within the data uncertainty. The mean V magnitude and colours were: V = 6.371 ± 0.016, U-B = 0.913 ± 0.015, and B-V = 1.154 ± 0.019. The JHK data were obtained at phase 0.8. We found: K = 6.55 ± 0.01, J-H = 0.58 ± 0.02, and H-K = 0.14 ± 0.02.

The spectral energy distribution of HR 7428 resulting from the ground based UBVRIJHK measurements and by the ISO data is shown in Figure 1, where the continuous line is the best fit to the experimental data till 1.2 μm assuming: a) black body emissions for the secondary (A2 V, R = 2 R☉, Teff = 8950 K) and primary (K2 III-IV, R = 62 R☉, Teff = 4400 K) stars; b) a distance of 600 pc. We note that this distance is about twice than the value given by Strassmeier et al. (1993).

The ISO measurements confirm the presence of an IR excess at wavelengths greater than 1.6 μm, with a definite inversion of the spectrum slope above 25 μm. An investigation on the nature of this relevant infrared excess is in progress.

References