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Low-Excitation Herbig-Haro Objects and Interstellar Extinction

Final Technical Report

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Previous work on low-excitation Herbig-Haro (HH) objects (Schwartz 1983)[1] has confirmed the existence of a strongly-enhanced hydrogen two-photon continuum which is produced by low-velocity shocks in neutral material. In the present study, we have compared the theoretical two-photon energy distribution with that observed for HH 43. With the addition of optical ($3300 < \lambda < 7000$Å) data to the ultraviolet ($1200 < \lambda < 3100$Å) data obtained with the I.U.E, the wavelength dependence of interstellar extinction toward HH 43 has been determined.

In summary, the extinction curve appears to follow that found for the nearby Θ Ori group of stars, with nearly neutral UV extinction, and an enhanced ratio of total to selective absorption ($A_V/E(B-V) \geq 5$). A best fit of observed data to the theoretical curve yields $E(B-V) = 0.2$. Continuum and emission-line data for HH 43 have been corrected for extinction, and an analysis of the energetics of the shock-excited pockets of gas has been carried out. Evidence suggests that a young, embedded stellar object with a luminosity of about 5 $L_\odot$ is producing a collimated, supersonic flow of material in which the HH 43 shocks appear with a luminosity of ~ 0.25 $L_\odot$. The mechanical luminosity associated with the outflow must therefore be a substantial fraction of the total luminosity of the young star.

This work has been reported at the January, 1985 meeting of the A.A.S. in Tucson (Schwartz and Dopita 1984), and a detailed paper is in press (Schwartz, Dopita, and Cohen 1985).

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References

Schwartz, R. D. 1983, Ap. J. Lett. 268, L37.

Schwartz, R. D. and Dopita, M. A. 1984. B.A.A.S. 16, 972.

Schwartz, R. D., Dopita, M. A., and Cohen, M. 1985.

Astron. J. (September, in press).