THE SPECTRUM OF A PARTIALLY IONIZED JET

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Observed stellar jets have the following characteristics : a high degree of collimation, a structure of bright, quasi-periodic knots, a very low excitation spectrum (red [S II] to Hα line ratios of 1–10). Assuming that the latter are indicative of the structure of a supersonic jet, we have made a detailed prediction of the emission line spectrum within each radiating *knot* using the multi-purpose code *MAPPINGS* which includes all the atomic processes important in low velocity shocks. The structure (density, temperature, ionization) of the stationary, supersonic, nonadiabatic stellar jet was computed separately using a hydrodynamical code developed by A. Raga. An initially overpressured supersonic jet tries to adjust its pressure to the environmental pressure. In this process of pressure adjustment, a series of expansion fans and incident/reflected shock pairs are formed along the jet. We associate the emission from the recombination region behind these *crossing shocks* with the *knots* observed in stellar jets. We find that the calculated emission spectrum is of remarkably low excitation.

SODIUM IONIZATION IN T-TAURI STARS

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We present the results of a study of the sodium ionization and excitation in the winds of low-luminosity, pre-main-sequence stars. Line profiles for the NaI doublet at 5990,5986 Åare discussed and compared with the observations for those T Tauri stars with P-Cygni profiles. We find that the observed shape of the lines put significative constraints on the rate of mass-loss ($M \geq 3 \times 10^{-8} M_{\odot}/yr$).

By comparing the properties of the NaI lines with the observed luminosity of infrared hydrogen recombination lines, such as Br_7, it is possible to determine at the same time the rate of mass-loss and the temperature of the inner regions of the wind, where both lines are formed. The results for four stars show that the wind is in general cool ($T_{gas} \lesssim 7000K$), and that the momentum in the wind is comparable to the momentum measured from CO lines.

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