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ANALYSIS OF THE PHYSICAL PROPERTIES OF JETS/OUTFLOWS IN T TAURI STARS

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Winds and jets are key factors in the evolution of accretion disks in pre-main sequence stars, and deriving their physical properties is one of the most important steps for a full understanding of the connection among outflow, jet and accretion processes. In this work we determine the physical properties of the high velocity component (HVC) and the low velocity component (LVC) emitting region of the optical forbidden [N II], [O I] and [S II] lines for the jets of DG Tau, SZ 102, CW Tau and RW Aur. We found two well defined ranges of temperatures and densities for the gas emission lines: one with 4.125 ≤ log T e (K) ≤ 4.55 and 2.25 ≤ log n e (cm^3) ≤ 5.25, and another one with
5.25 ≤ log T e (K) ≤ 5.6 and 5.25 ≤ log n e (cm 3) ≤ 6.75. The LVC has high temperatures and high densities for DG Tau and CW Tau, whereas for SZ 102 it has much lower densities and temperatures. The peak velocities and full width at half maximum of the LVC pointed out that its origin is from a MHD disk wind at 0.05-1.69 AU and that Keplerian rotation is the main responsible of the broadening of the lines. The relation found between the accretion luminosity with the LVC's temperature and density, suggests that the accretion plays an important role in the physical properties of the emitting region, likely a steady accretion is performing in the outflow driving region. We did not find evidence of Keplerian broadening for the HVC, whereas we found a correlation between the mass loss rate and accretion luminosity, probably because episodic accretion is occurring in the region where the jet is driven.

Contribution

Talk

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