COORDINATED MULTI-SPECTRAL COVERAGE OF T TAURI STARS

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We present results from an ongoing program to obtain observations of T Tauri stars of the sort required for detailed model atmosphere analyses of these objects. The primary requirement for such observations is that they be calibrated in absolute flux units, and it is very desirable to have both extensive coverage in the continuum and high resolution line profiles. This is more difficult for T Tauri stars because of their variability, which makes it necessary to obtain all the observations at nearly the same time. We report on a program using the Nickel 1-m telescope at the Lick Observatory in conjunction with a reticon on the Shane 3-m telescope and the International Ultraviolet Explorer to obtain good calibrated coverage of the brightest T Tauri stars. We both present the observations and comment on their implications for recent T Tauri models.

POLARIZATION PROPERTIES OF T TAURI STARS

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Linear polarization observations are now available for over 100 T Tauri and FU Orionis stars. A survey in two bands cover all T Tauri stars brighter than 13th magnitude and many fainter ones. The wavelength dependence has been measured for 20 stars, and 6 stars have been measured in the near infrared.

Polarization is typically 1 to 2%, but can be as high as 12%. Polarization variability has been detected in at least 45% of the stars with sufficient data. The polarization and its position angle are in general a function of both wavelength and time. There is no standard wavelength dependence of polarization for T Tauri stars. The polarization does not appear to vary across emission or absorption features. A 90°change in position angle is sometimes observed in the infrared. Correlations exist between polarization and infrared excesses, $E(B-V)$, and position in the HR diagram.

The polarization is due to scattering of light from the stars and their gas emitting envelopes by dust grains located in non-axisymmetric extended circumstellar shells outside the emitting regions. The grains have diameters between 0.05 and a few microns. In some cases, there is evidence for a bimodal grain size distribution. Grain growth and destruction could explain the time variations observed in the wavelength dependence of the polarization. A simple orbiting dust cloud model can explain partly the temporal variations of the polarization in one bandpass for a few stars.