## Modeling the Submillimeter Dust Continuum Emission from Nearby Low Mass Star Forming Cores

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Current theories of a low mass star formation predict the evolution of the density distribution, $n(\vec{r},t)$, temperature distribution, $T(\vec{r},t)$, and the velocity field ,$\vec{v}(\vec{r},t)$, of the envelope of protostellar cores with time. Optically thin dust emission at submillimeter wavelengths provides a powerful diagnostic to constrain the envelope density and temperature structure. In this study, thirty-nine low mass cores were mapped with SCUBA at 850 and 450 $\mu$m on the JCMT during sixteen nights between January 1998 and February 2000. The sources were selected from the earliest phases (pre-T Tauri) in the proposed evolutionary scheme for low mass protostars (6 Pre-protostellar Cores (PPCs), 15 Class 0, 18 Class I) with luminosities indicative of low mass star formation ($L_{bol} < 50\ L_{\odot}$) and with distances less than 450 pc. High signal-to-noise maps allowed azimuthally averaged radial profiling out to 60 arcseconds from the continuum centroid. The similarities and differences in the submillimeter continuum emission properties of the envelopes of PPCs, Class 0, and Class I sources on $10^3$ to $10^4$ AU scales are summarized.

We have modeled the normalized radial intensity distributions and spectral energy distributions (SED) for sixteen sources from the SCUBA survey (3 PPCs, 7 Class 0, and 6 Class I) using a one dimensional radiative transfer code (Egan, Leung, & Spagna 1988) with internal heating from a central protostar (Class 0 and I objects) and external heating from the interstellar radiation field (all objects) to calculate the dust temperature distribution. Power law, Bonnor-Ebert, Shu inside-out collapse, and Plummer density distributions were tested to match the observed normalized radial profiles and observed SED simultaneously. Realistic beam profiles and chopping were used to simulate the observations. We find Bonnor-Ebert spheres with central densities of $10^5$ to $10^6$ cm$^{-3}$ reproduce the PPC radial profiles while power law models ($n(r) \sim r^{-p}, p = 1.1-2.3$) reproduce the Class 0 and Class I profiles. Properties of the best fit models and future modeling efforts are discussed.

Egan, M. P., Leung, C. M., & Spagna, G. R. 1988, Comput. Phys. Comm., 48, 271