*Triggered Star Formation in a Turbulent ISM*
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# Modeling the dust and gas temperatures near young stars

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**Abstract.** As young stars form, they interact with their environment in many ways. We study the radiative interaction of a young star with its surrounding cluster environment. The change in gas temperature caused by a forming star can trigger the formation or inhibit the growth of nearby star forming cores. We calculate the gas temperature around a single star by balancing the dust-gas collisional heating, molecular cooling, and cosmic ray heating rates for a grid of models with various luminosities and density distributions. In the future, this work can be used in large-scale simulations of clustered star formation to study the effect of using a gas temperature which depends not only on density, but also on radiative environment.

**Keywords.** stars: formation, methods: numerical

## 1. Dust and Gas Temperature

In order to calculate the dust temperature, we have created a grid of models using the spherical radiative transfer code, DUSTY (Ivezic *et al.* 1999). We assume that the central star is a black body with T=10,000K and a luminosity between $10^{-2}$ $L_\odot$ and $10^5$ $L_\odot$. The dust properties are given by OH5 dust (Ossenkopf & Henning 1994). The spherical density profile is exponentially decreasing. We use an energy rate balance code to calculate the gas temperature (Doty & Neufeld 1997). We include gas-dust collisional temperature coupling, cosmic-ray heating, and CO cooling (Young *et al.* 2004). Figure 1 shows an example model.

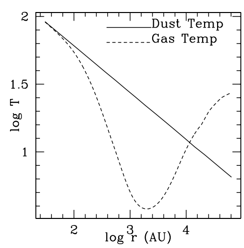


**Figure 1.** Model Parameters: $L=10L_\odot$, $n=10^{4.5}cm^{-3}$ at 1000AU. The dust and gas are well–coupled via collisional heat transfer in the center. As the density decreases, the gas is able to cool efficiently through molecular lines. Cosmic-ray heating becomes important as the density decreases even more.

## References

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