Triggered Star Formation in a Turbulent ISM
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3D dust radiative transfer simulations in the inhomogeneous interstellar medium

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Abstract. The study of dusty discs is an important topic in astrophysics, as they seem to be abundant around different objects and are related to different phenomena. In this poster we present 3D radiative transfer simulations of T Tauri type discs with an inhomogeneous dust distribution to investigate the effect of a clumpy medium on the dust temperature distribution. Our initial results indicate that the structure of the dust temperature distribution is rather insensitive to the structure of the ISM, but nevertheless we find a clear and systematic dependence on the parameters describing the structure of the clumpiness of the dust medium.

We present detailed radiative transfer simulations of an inhomogeneous circumstellar disc around a T Tauri-type star. We create a two-phase dust medium consisting of dense clumps in a smooth interclump medium. This two-phase medium is characterized by two parameters, the filling factor *ff* and the density contrast C. The models presented here were performed using the SKIRT code, an efficient 3D Monte Carlo radiative transfer code. For arbitrary distributions of dust, the code computes the equilibrium dust temperature distribution and emerging spectra.

Our simulations demonstrate that the dust temperature depends systematically on the clumpiness parameters in a subtle way. As an illustration we show in Figure 1 the mean temperature of the dust medium explicitly as a function of *ff* for two different values of C. For a fixed density contrast, the maximum mean dust temperature is reached at intermediate filling factors. This is normal, as the medium is completely smooth in both the limits $ff = 0$ and $ff = 1$. At intermediate cases, the interclump medium is less dense and warmer, whereas the clumps are dense and cool. The maximum mean dust temperature is higher and reached at lower filling factor values if C increases.

We intend to run more simulations with a larger range of geometries, optical depths and clumpiness parameters to investigate the effects of a non-homogeneous ISM in a more systematic way.

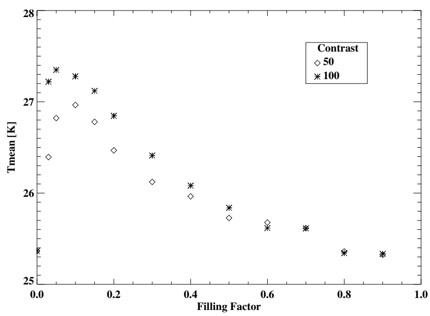

Figure 1. The mean dust temperature of our circumstellar disc for various models with different clumpiness parameters.