There are strong deviations from the spherical assumption profile (Plummer 1911) with a slope parameter the BE model of Alves et al. (2001).

The next steps will include a full 3D radiative transfer modelling of B68 and a detailed analysis of the properties of the neighbouring cores that perhaps once belonged to the same fragment.

Dust temperature and density distribution

The ray-tracing algorithm yields dust temperatures and densities for every modelling cell. From the resulting data cube, we extract 2D maps of the dust temperature and density distribution for the mid-plane, i.e. the data layer that coincides with the mid-plane of the model.

We find a dust temperature gradient from an azimuthally averaged T = 16.7 K at the edge to 26.8 K in the centre of B68, which is lower than predicted by a simple SED fitting approach. The central hydrogen column density was found to be $N_H = 4.3 \times 10^{22} \text{ cm}^{-2}$, and the corresponding volume number density in $n = 4.5 \times 10^3 \text{ cm}^{-3}$.

Summing up the material with $A > 0.2 \text{ mag}$, we find a total mass of $3.5 \times 10^4 \text{ M}_\odot$ at an assumed distance of 150 pc. Only about $1.0 \times 10^4 \text{ M}_\odot$ are within a radius of 5000 AU, which is the range of the BE model of Alves et al. (2001).

The radial density distribution (Fig. 3) follows a Plummer-like profile (Plummer 1911) with a slope parameter $\eta = 4$ as prescribed by the BE model of pre-stellar cores (Whitworth & Ward-Thompson 2001).

Anisotropic interstellar radiation field

The asymmetric morphology of the mass loss in the 100 and 500 μm bands can only be explained by surface heating effects caused by a strongly anisotropic interstellar radiation field (ISRF). 3D radiative transfer calculations (Fig. 6) are consistent with an irradiation by the Galactic Centre and the galactic plane.