RevMexAA (Serie de Conferencias), **15**, 135–135 (2003)

THE DUSTY ENVELOPE OF L 723 AT SUB-MM WAVELENGTHS

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L 723 has an associated CO outflow with a quadrupolar morphology (Goldsmith et al. 1984; Lee et al. 2002). The larger pair of lobes is aligned in an east-west direction, while the other pair is roughly in a north-south direction. The powering source of the large east-west outflow is IRAS 19156+1906, associated with the thermal radio jet VLA 2 (Anglada et al. 1991; Anglada, Rodríguez, & Torrelles 1997).

The dense core of L 723 was mapped in ammonia by Torrelles et al. (1986) and Girart et al. (1997). The ammonia emission arises from a V-shaped structure elongated in the east-west direction, with VLA 2 located near its center. Toward VLA 2 there is gas heating and line broadening. Another hot spot is found $\sim 10''$ west of VLA 2.

Submillimeter continuum observations at 850 and 450 μm were carried out using the SCUBA camera on the JCMT. The half-power beam width (HPBW) of the main beam was measured to be $14\rlap{.}''9$ at 850 μm and $8\rlap{.}''5$ at 450 μm. In Figure 1 we show the maps obtained for L 723 at 850 μm and 450 μm. The emission is extended at both wavelengths and is elongated in the direction of the outflow, closely following the ammonia emission. The best fit of the spectral energy distribution was obtained for $T_{\rm d} = 19\,{\rm K}$, $\beta = 1.5$, and $M = 0.8\,M_\odot$.

We modeled the observed intensity radial profile at both wavelengths by means of an optically thin, spherically symmetric envelope surrounding the protostar. Assuming that the density and temperature follow power laws, the intensity is a power law of the projected distance. The best fit was obtained for a density power-law index $p = 1.9$, a total mass of $1.5\,M_\odot$(using the Beckwith et al. 1990 dust opacity law), and an envelope radius of $\sim 30,000\,{\rm AU}$.

In the scenario of the inside-out collapse model of Shu, Adams, & Lizano (1987), the density power-law index obtained is near the value for the singular isothermal sphere, indicating that the region of free-fall collapse is smaller than the angular resolution of our observations, and that the source may be very young.

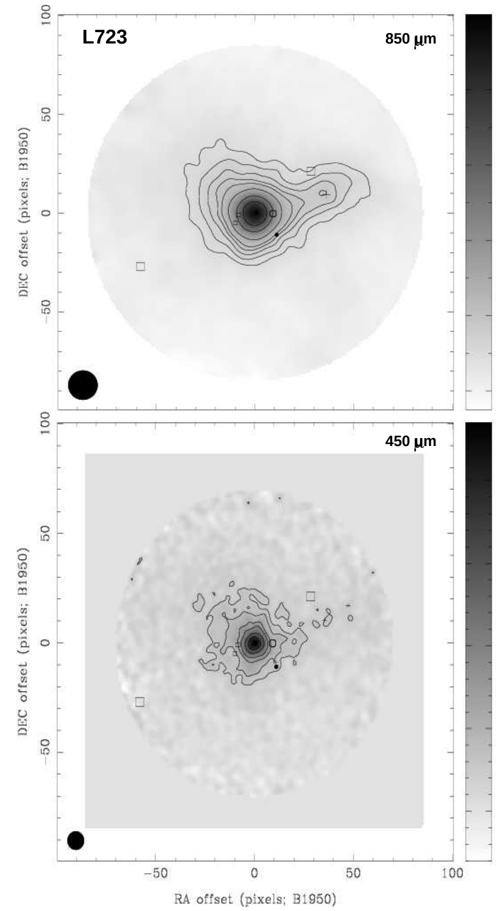

Fig. 1. L 723 maps at 850 μm (top) and 450 μm (bottom).

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