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NEW RESULTS FROM OBSERVATIONS OF MASSIVE STAR FORMATION IN THE MID-INFRARED WITH LARGE APERTURE TELESCOPES

James M. De Buizer[1]

Thanks to the high spatial resolution afforded by 8–10-m class telescopes, we are beginning to learn that some sources are extended in their mid-infrared emission because of dusty outflows or heated outflow cavity walls. Therefore one must be extremely careful in interpreting the nature of extended mid-infrared sources (i.e. just because it is extended does not automatically mean it is a disk!).

Recent high spatial resolution observations of massive young stellar sources have yielded evidence of MIR emission (5-25 μm) from outflows and jets. These observations correlate well with other larger-scale outflow indicators and their geometries, such as what is seen in shock-excited H_2 and CO emission.

De Buizer & Minier (2005) and De Buizer (2006) showed two massive young stellar sources with clear MIR signatures from outflow. Another source that might be added to this list is IRAS 20126+4104 (De Buizer 2007). This source is considered THE prototype of a young massive star with a circumstellar disk (see Cesaroni et al. 2007 for a review). The "disk" can be seen in mm continuum as well as molecular line emission, but because it is thousands of AU in size, there is disagreement as to whether this "disk" is a real circumstellar accretion-type disk or a larger flattened envelope that feeds a smaller central accretion disk. There is also a large-scale outflow at an angle close to perpendicular to the "disk".

Recently, the 2 μm images of Sridharan et al. (2005) showed a double-lobed structure separated by a "dark lane" here at the center of IRAS 20126+4104. It was claimed that this was a silhouette disk, similar to those seen around low mass stars. It was also claimed that the 5 μm emission may be coming from the thermal dust emission from the central accretion disk in the dark lane. Using Michelle on Gemini North high spatial resolution MIR images of this region were obtained. It was found that the thermal dust emission is distributed in double-lobed structure with a dark lane at the same location of the dark lane in the 2 μm emission. The 5 μm emission was found to be coincident with the south-

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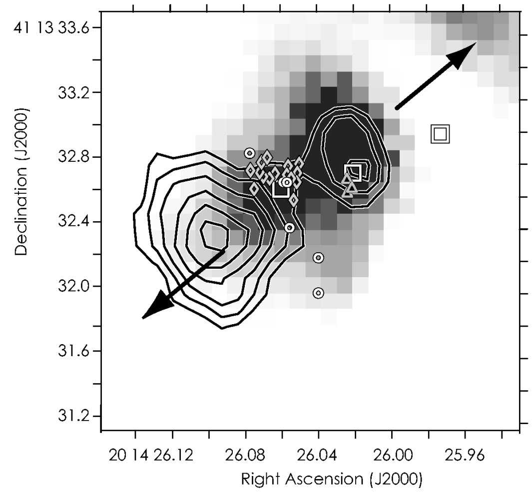

Fig. 1. The deconvolved 12.5 μm image of IRAS 20126+4104. The black contours are the 2 μm emission of Sridharan et al. (2005). Maser components are shown: OH (circles), water (triangles), and methanol (diamonds) from Edris et al. (2005); and water (squares) from Tofani et al. (1995). Arrows show the outflow angle.

eastern MIR emission lobe and therefore no thermal emission is actually seen directly from the dark lane. Figure 1 shows that the MIR and near-IR emission are likely coming from the outflow cavities centered on some unseen source at the center of the dark lane. The maser emission in this region appears to be associated with the IR emission of the outflow cavities and not the dark lane itself.

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