The Spectral Energy Distribution in massive young stellar objects

Paolo Persi¹, Mauricio Tapia², David Elia³, Sergio Molinari³, Miguel Roth⁴

¹IASF-Roma/INAF Italy, ²IA-UNAM Ensenada, Mexico, ³IFSI-Roma/INAF Italy, ⁴Las Campanas Observatory, Chile

We have undertaken a study of a sample of southern hemisphere massive protostellar candidates including near-IR, Spitzer/IRAC and Herschel/HIFI images. All the selected sources listed in Table 1 have been observed at millimeter wavelengths by Beltran et al. 2006.

Table 1: List of the observed massive protostellar candidates

<table>
<thead>
<tr>
<th>Source</th>
<th>H</th>
<th>Ks</th>
<th>H-K</th>
<th>L</th>
<th>L/k</th>
</tr>
</thead>
<tbody>
<tr>
<td>IRAS 12272-6240</td>
<td>70μm</td>
<td>10μm</td>
<td>160μm</td>
<td>250μm</td>
<td>350μm</td>
</tr>
<tr>
<td>IRAS 16112-4943</td>
<td>75μm</td>
<td>10μm</td>
<td>160μm</td>
<td>250μm</td>
<td>350μm</td>
</tr>
<tr>
<td>IRAS 17149-3916</td>
<td>70μm</td>
<td>10μm</td>
<td>160μm</td>
<td>250μm</td>
<td>350μm</td>
</tr>
</tbody>
</table>

Table 2: Physical parameters of the HMYSOs derived from the best-fit model of the Robitaille et al model.

IRAS 12272-6240 is characterized by the presence of a Herschel point source coincident with the 1.2mm emission. At this position a very red near-IR source with an associate H2 knot is present as shown in Fig. 1. The source is also coincident with a methanol and H2O maser. Its SED reported in Fig. 2 is well fitted by the Robitaille et al. 2007 model.

The SEDs of the two sources are reported in Fig. 3. While the model fits well the observed spectral point of source #1, a discrepancy is observed especially at lower wavelengths in source #2. This is due probably to the extension of this source.

Three sources coincident with the 1.2mm sources have been detected by Herschel. Sources #1 and #3 have a NIR and MID-IR counterparts, while source #2 has been detected only at 70μm and 1.2mm. This source could indicate the presence of a prestellar dense core in RCW21. The SEDs of the three sources are shown in Fig. 4.

The source #3 is associated with a H2 knot, while the source #1 is very close to a methanol maser.

References
Beltran et al 2006 A&A 447 221
Robitaille et al 2007 ApJS 169 328