

An Infrared Study of Massive Protostellar Candidates

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ABSTRACT: We have undertaken an infrared study of a sample of 20 candidates high mass protostellar objects from northern and southern hemisphere. Here we present the preliminary results of 9 southern hemisphere HMYSOs candidate selected from the paper of Beltran et al. 2006 A&A 447 221.

Table 1 reports the list of the observed sources including the IRAS luminosities and the mass estimated from the 1.2mm continuum.

Table1: List of the observed HMYSO candidates

IRAS	Type	R.A.(J2000)			Dec(J2000)		d_n (Kpc)	d_r (Kpc)	L_{IRAS} ($\times 10^3 L_{sun}$)	M M_{sun}	
		h	m	s	o	'					"
12127-6244	H	12	15	23.9	-63	01	20	10.8	10.8	1830	15800
12272-6240	H	12	30	04.0	-62	56	56	11.2	11.3	345	6880
13395-6153	L	13	42	59.5	-62	08	43	5.3	5.3	277	1120
15015-5720	H	15	05	19.2	-57	31	48	2.6	10.4	56	197
15507-5359	H	15	54	36.5	-54	08	40	5.0	9.4	193	1480
16085-5138	H	16	12	27.0	-50	46	18	4.3	10.6	153	1100
16112-4943	H	16	15	01.3	-49	50	37	3.3		77	1080
16428-4109	L	16	46	22.6	-41	14	58	2.7		4	
17149-3916	H	17	18	23.8	-39	19	10	2.1		94	586

Near-infrared images through narrow-band Br γ ($\lambda = 2.165 \mu\text{m}$; $\Delta\lambda = 0.022 \mu\text{m}$) and H $_2$ ($\lambda = 2.125 \mu\text{m}$; $\Delta\lambda = 0.024 \mu\text{m}$), as well as through standard broad-band JHK, filters were collected on the nights of 2009 June 10-13, using the Perssons Auxiliary Nasmyth Infrared Camera (PANIC) attached to the Magellan Baade 6.5 m telescope at Las Campanas Observatory (Chile). PANIC has a Rockwell 1024 \times 1024 Hawaii array that provides a 2' \times 2' field of view with a 0.125 /pixel scale.

A gallery of color-coded images made from the K $_s$ (red), H(orange) and J(blue) individual images of the IRAS sources of Table 1 is reported in Figure 1. The contours in the figures represent the 1.2mm continuum from Beltran et al. 2006.

The images show the presence of clusters of very red objects in correspondence of the millimeter sources. The nature of these embedded young stellar clusters is under study using the JHK, photometry of the single images. The regions are included in the AKARI survey and few sources have been observed in the mid-IR (IRC) and in the far-IR (FIS)(Tables 2 and 3). Combining our near-IR photometry with these data will be possible derive the SEDs and to study the characteristics of these HMYSOs. As an example, we have reported on the K $_s$ image of IRAS12127-6244 the positions of the AKARI sources as well as the 6cm radio continuum and the mid-IR source observed with TIMM2.(see Figure 2)

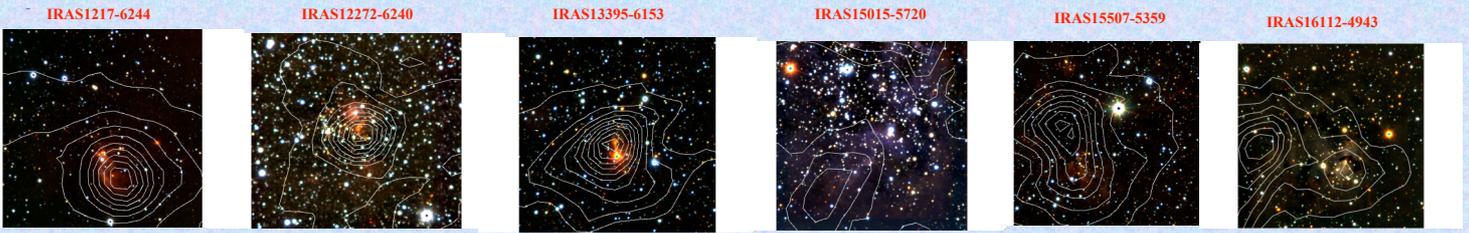


Table 2

Source	SURVEY AKARI (IRC)		F(9) Jy	F(18) Jy
	R.A.(J2000)	Dec.(J2000)		
IRAS12127-6244*	12 15 24.42	-63 01 24.5		785.07(30.06)
IRAS12272-6240*	12 30 04.27	-62 56 41.5	13.30(1.49)	464.39(11.89)
IRAS13395-6153	13 43 03.11	-62 07 15.2	6.26(1.18)	
IRAS15015-5720*	15 05 17.05	-57 31 32.6	233.49(8.11)	
IRAS15507-5359*	15 05 25.21	-57 30 57.5	5.59(0.45)	
IRAS16112-4943*	16 15 02.19	-49 50 38.9	30.06(0.12)	386.28(10.24)
IRAS16428-4109	16 46 20.70	-41 14 45.6	10.48(0.24)	10.32(0.69)

Table 3

Source	R.A.(J2000)	SURVEY AKARI (FIS)				
		Dec.(J2000)	F(65) Jy	F(90) Jy	F(140) Jy	F(160) Jy
IRAS12127-6244*	12 15 26.40	-63 01 15.3	1719.97(463.64)	823.96(205.50)	1304.52(152.39)	1690.41(251.07)
IRAS12272-6240*	12 30 03.13	-62 57 00.2	569.01(123.56)	501.53(85.60)	804.88(59.72)	799.63(90.42)
IRAS13395-6153	13 43 01.32	-62 08 58.6	1505.69(453.66)	849.09(207.869)	1436.78(127.32)	
IRAS15015-5720*	15 04 35.41	-54 08 44.3	1153.11(18.98)	777.82(80.60)	692.29(20.60)	1216.42(90.80)
IRAS15507-5359*	15 05 04.10	-49 50 21.4	1184.60(88.58)	522.85(28.56)	1117.58(11.82)	
IRAS16428-4109	16 46 21.13	-41 14 38.0	131.80(7.91)	143.93(6.64)	127.92(83.15)	
IRAS17149-3916	17 18 22.94	-39 18 49.2	1449.28(174.31)	713.90(87.46)	1798.31(216.40)	

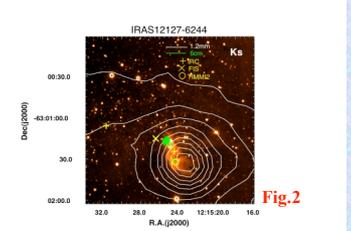


Fig.1 121"X121" color coded images (J(blue),H(green), K $_s$ (red)) of the IRAS sources North is to the up, east is to the left.

We have used new color-coded images obtained by combining the K $_s$ (blue), Br γ (green) and H $_2$ (red). These images reported in Figure 3, are particularly useful in order to search for hydrogen molecular knots and Br γ emission in star forming regions. From a first analysis of Figure 3 results that extended Br γ emission is observed towards IRAS12127-6244, IRAS 12272-6240, IRAS15507-5359, IRAS16112-4943 and IRAS 17149-3916, while hydrogen molecular knots are observed in IRAS12272-6240, IRAS 13395-6153 and IRAS 17149-3916.

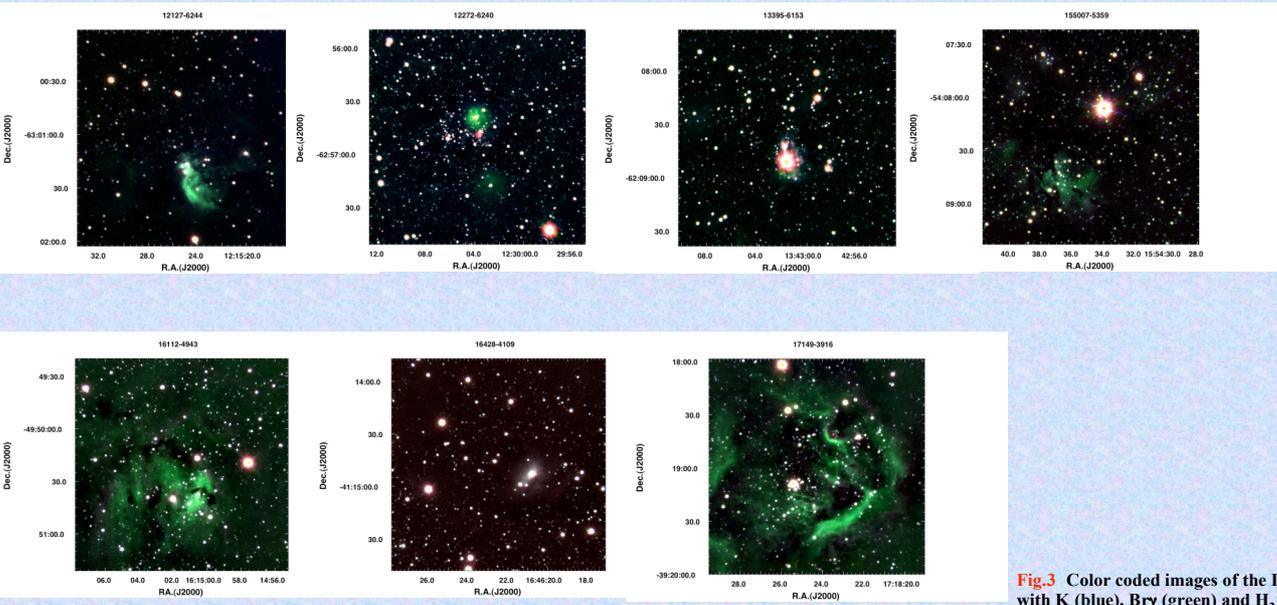


Fig.3 Color coded images of the IRAS sources of Table1 made with K $_s$ (blue), Br γ (green) and H $_2$ (red) individual images.

Summar: We have presented very preliminary results relative to a selected sample of candidate HMYSOs. The analysis of the near-IR photometry, and the study of the SEDs are still in progress.