ON THE CONNECTION BETWEEN THE IRAS POINT SOURCES AND GALACTIC NONSTABLE OBJECTS

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ABSTRACT. The connection between the IRAS point sources catalog and following objects is studied: 1. H_2O masers, 2. Herbig - Haro objects, 3. Cometary nebulae, 4. Compact nebulae,situated in the large nebulae, and 5.Dark globules. It is shown, that more than 50% of the 1,2,3,and 4 type objects are connected with the IRAS sources. More than 10 new H_2O masers, connected with IRAS sources are found, one of them having very unusual properties. More than 10 dark globules are found in the Cep OB2 association, which are connected with IRAS sources. One of these sources consists of 4 components, forming a Trapezium-like configuration.

1. INTRODUCTION

It is well known, that many IRAS point sources [1] are connected with star-formation regions. We were interested to reveal the connection between IRAS point sources [2] and unstable young objects of our Galaxy (mainly situaited near star-formation regions): 1. HH objects, 2. cometary nebulae, 3. Trapezium-type tight systems, 4. compact nebulae,situated in the large nebulae, 5. dark globules.

We were looking for IRAS point sources in the circle with radius 2', centered on the object. The IRAS sources, satisfied two following restrictions, were choosed: 1. $F_{100} >$ 10 Jn, 2. the flux for IRAS source is given not only for 100 μm,but also for at least one of other wavelengths (12,25 or 60 μm).

2. UNSTABLE OBJECTS

In Table 1 the results of this search are given. In the first column the types of objects are given. HHL are the

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objects, found in Byurakan, CLN - all known so far cometary and cometary-like nebulae, Tr- Trapezium-type tight systems, consisted mainly of T Tau type stars [3], c.n. - compact nebulae, embedded in the large nebulae [1]. In the second column the number of objects is given; in the third column - the number of objects, taking into account their doubling (if two objects accidentally fall in the same circle with 2' radius, we count them as a single object). Corresponding to [4], the IR colours of IRAS sources can be used for the determination of the type of objects, connected with IRAS sources. In dependence of the values of three quantities

$$R_{12} = \lg\frac{F_{25}\cdot 12}{F_{12}\cdot 25}\,,\quad R_{23} = \lg\frac{F_{60}\cdot 25}{F_{25}\cdot 60}\,,\quad R_{34} = \lg\frac{F_{100}\cdot 60}{F_{60}\cdot 100}$$

the IRAS sources in [4] are devided into three types: 1. probably connected with H_2O masers, 2. probably connected with T Tau type stars, 3. probably connected with embedded not evolved objects. In the fourth column of Table 1 is the percentage of IRAS sources of type 1, in the fifth- of type 2, and in the sixth - of type 3, in the seventh column - the percentage of sources, not involved in this classification, in the eighth - the number of objects, connected with IRAS sources are given.

TABLE 1. Nonstable objects and IRAS sources.

1	2	3	4	5	6	7	8
HHL	79	70	59	10	14	17	32
CLN	176	165	49	23	14	14	82
Tr	12	12	37	0	36	27	11
c.n.	10	9	71	0	0	29	9

2.1 HHL OBJECTS

The percentage of type 1 sources is rather high. It is known, that 13 HHL objects are connected with H_2O masers, and 10 of these objects are also connected with IRAS sources (all these sources are of type 1) [2]. Hence we can conclude, that the percentage of HHL objects connected with IRAS sources is much higher among these 13 objects, than among all HHL objects.

2.2. CLN OBJECTS

These objects have the highest percentage of type 2 sources (many CLN objects are connected with T Tau type stars).

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2.3.TR AND C.N.OBJECTS

From the Table 1 we can conclude, that the percentage of connected with IRAS sources Trapezium-like tight systems, as well as compact nebulae is very high, and it is remarkable, that all the classified IRAS sources, connected with the compact nebulae, are of type 1.

3. IRAS SOURCES IN THE ASSOCIATION CEP OB2

We choosed IRAS sources, which are projected on this association and are of type 1. There are 21 such sources. The search of H_2O masers, connected with these sources, revealed 11 such masers. The percentage of masers is several times higher, than among the field IRAS sources. Especially interesting is the maser, connected with IRAS 21144+5430, this maser is unusual, because the ratio $F_{H_2O}/F_{100\ \mu m}$ is at least 10 times larger than for already known objects.

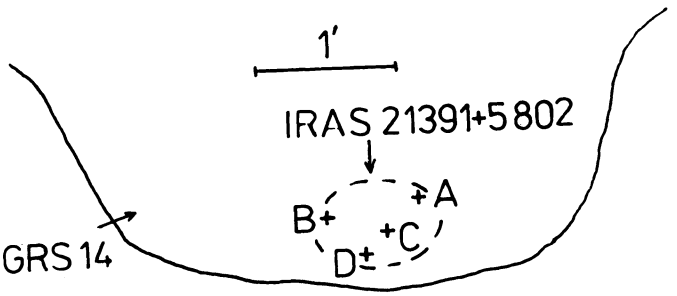

Figure 1. IRAS source with 4 components in GRS 14.

There are at least three radial systems of dark globules in this association. They contain at least 36 globules , and 11 of them are connected with IRAS sources. Especially interesting is the globule GRS 14. The IR observations of IRAS 21391+5802, connected with this globule, revealed an unusual situation. This source consists of 4 components, which form the Trapezium-type configuration (Fig. 1). The near-IR colours of these components correspond to A-F class stars. Hence the birth of the stars in Trapezium-type groups can take place not only among the massive early type stars (as in Kleinmann-Low nebula), but also among the not so

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bright and not so massive stars. In this globule a CO molecular outflow and water vapor maser are also revealed.

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