POSTER CONTRIBUTIONS (ABSTRACTS)

ABOUT FORMATION OF HERBIG-HARO OBJECTS

A.L. Gyulbudaghian

Byurakan Astrophysical Observatory, Armenia, USSR

It is well known, that HH-objects have been discovered mainly in the regions of star formation. These objects compose the groups of objects, there are also singular objects. The groups of HH-objects have Trapezium-like or chain-like configuration in which the distances between the members are of the same order (Ambartsumian 1954). Irrespective of configuration formed by these objects, there is no doubt about the instability of these systems.

It was suggested in Gyulbudaghian (1977) on the basis of investigation of known observational data, that the HH-objects have been expelled from the bodies, situated in dark nebulae (perhaps from the stars or the bodies, consisting of superdense matter). In the same paper it was told that at least in some of the HH-objects the large radial velocities are due to real motions of HH-objects (other authors supposed that the radial velocity was wholly due to the outflow of matter). The recent papers of Herbig and Jones (1981, 1982), have confirmed the hypothesis of expulsion of HH-objects. They have found that the tangential velocities of some HH-objects were of the order of 50-200 km s^{-1} (what is comparable with the values of radial velocities).

In this report we are interested with the tangential velocities of condensations, the groups of which compose the objects HH 1, HH 2, and HH 39. The tangential velocities of the condensations, the groups of which compose a definite HH-object, have different values, but there is not any explanation to this phenomenon in Herbig and Jones (1981) or Jones and Herbig (1982).

It seems to us that as the different values of the condensation velocities in the groups, as well as the different directions of these velocities can be explained as follows. Let us suppose, that the HH-objects are formed during the division of a more massive body, and this division can take place as a single act (then we are able to expect an origin of a group of objects, diverging in different sides), and as a sequence of successive expulsions (then we have a chain-like group). As was told previously, there are Trapezium-like systems, as well as chain-like systems amid the known groups of HH-groups.

Now let us consider the objects HH 1, HH 1 and HH 39 separately (each of these objects consists of a group of condensations). The distribution of condensations forming HH 1 is given in Herbig and Jones (1981). If we accept that the masses of condensations A, C, D and F are equal to each other (because their luminosities are of the same order) it is possible to obtain the velocity of the body, the division of which has given the present group of condensations. We ought to find the arithmetic mean value of the velocities of condensations (the law of the conservation of impulse has been used). We have obtained as the mean value 240 km s^{-1} and position angle 326°. Now we are able to obtain the values of velocities of condensations A, C, D and F in the centre-of-mass system: for A 90 km s^{-1}, 127°; for C, 38 km s^{-1}, 168°; for D, 10 km s^{-1}, 353°; for F, 115 km s^{-1} , 314°.

These velocities indicate that the group of condensations forming HH 1 is expanding.

Let us now consider the object HH 2. In this object it is possible to distinguish a chain (C, B, G, E) and a Trapezium-like system (A, D, H, I). We propose, that we deal with two successive decays. At first, the initial body has disintegrated into two objects, afterwards one of these objects has formed the chain, and the second -the Trapezium-like system. For the velocity of the second body (before its division) we have obtained 175 km s^{-1}, 162°. For the internal velocities of condensations, forming the Trapezium-like system, we have: for A, 30 km s^{-1}, 20°; for D, 110 km s^{-1}, 319°; for H, 79 km s^{-1}, 123°; for I, 64 km s^{-1}, 173°.

These velocities indicate that in the centre-of-mass system the group of condensations composing HH 2 is again expanding.

Let us consider now the object HH 39 in the north of R Monocerotis. It consists of the condensations A, B, C, D, E and F. The tangential velocities of