IS THE CHAIN OF GALAXIES NEAR NGC 247 ANOMALOUS ?

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АНОМАЛЬНА ЛИ ЦЕПЬ ГАЛАКТИК ВБЛИЗИ NGC 247 ?

I n t r o d u c t i o n. The Burbidge's chain is located at 20' NE of NGC 247; it consists of 5 late-type galaxies A, B, C, D, E lying about 8' from north to south (Fig.1). Two components are predominant (86% of the total luminosity); their spectra were taken by Burbidge *et al.* (1963). They derived recession velocities of 6164 km s^{-1} and 6308 km s^{-1} respectively for B and E. In view of the emission features observed in these spectra and of the remarkable alignment of the members of the chain, these authors concluded at a possible recent formation of this object.

On the other hand, Arp (1973), by statistical considerations of the neighbourhood of nearby spiral galaxies, proposed that there could be a physical association between NGC 247 and the chain, and therefore anomalous redshifts in the group. An answer to Burbidge's and Arp's proposals can be given by the use of 21-cm line and optical observations.

21 - c m l i n e o b s e r v a t i o n s. The 21-cm line observations were carried out with the Nançay radiotelescope, with 15 adjacent channels spaced by 63.3 km s^{-1}; the beam of the instrument is 4' x 24' at this declination, so that the different members of the chain are not resolved. Figures 2 and 3 present the profiles obtained at the optical positions of B and E. As B and E are predominant in luminosity the main contribution to these profiles is provided by these galaxies, even if A, C and / or D have velocities in the range displayed in the observed line. Note the dissymmetry of the two lines with a reinforcement at the optical velocity of E, and which is more pronounced on the line obtained at the position of E; note also that the centre of the profile obtained on B is nearly at the optical velocity of B. These peculiarities can be accounted by the fact that B is nearly edge-on, whereas E is face-on.

D i s t a n c e d e t e r m i n a t i o n s. The derivation of the distance of a galaxy is based on relations between its total parameters (Balkowski et al., 1973). The distance criteria are applied to the galaxy B which is presumably predominant in the total profile. For that purpose the most likely values of the width and of the area of the 21-cm line of B must be drawn from the total profile; three cases have been considered according to the contribution of the other galaxies to this profile.

The distance values with their errors are given in Table 1. A special care was taken for the error calculations, in particular the true dispersions were used in the relations involved.

In the three considered cases, the calculated values d are in complete agreement with the cosmological distance $d_c = 89^{+16}_{-13}$ Mpc using a Hubble constant $H = 70 \pm 13$ km s^{-1} Mpc^{-1} (Durand, 1975) obtained from the same distance criteria as ours. On the contrary d is not compatible with $d' = 1.8^{+0.7}_{-0.5}$ Mpc, the distance of NGC 247; the discrepancy being more 3.9 times the mean uncertainty.

C o n c l u s i o n. Therefore a physical association is ruled out between B and NGC 247. This conclusion is probably true for the whole chain.

On the other hand no evidence of youth of the chain is brought to light, neither from the dynamical state (probable stability of the chain), nor from the neutral hydrogen content which is fairly normal for the types involved.

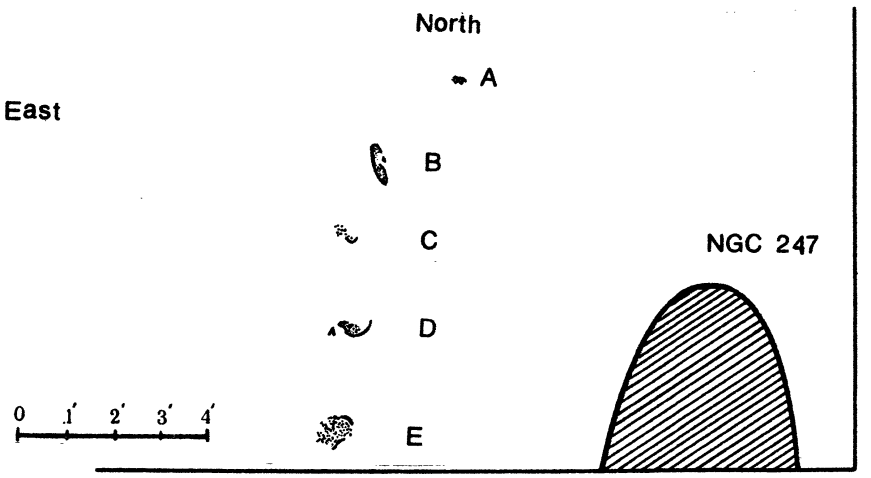

Fig. 1.

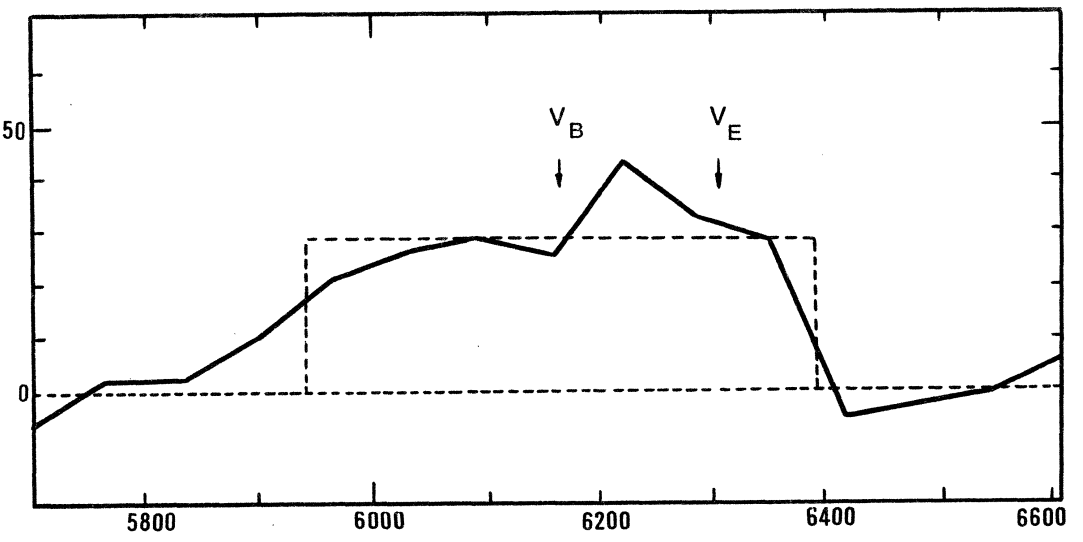

Fig. 2.

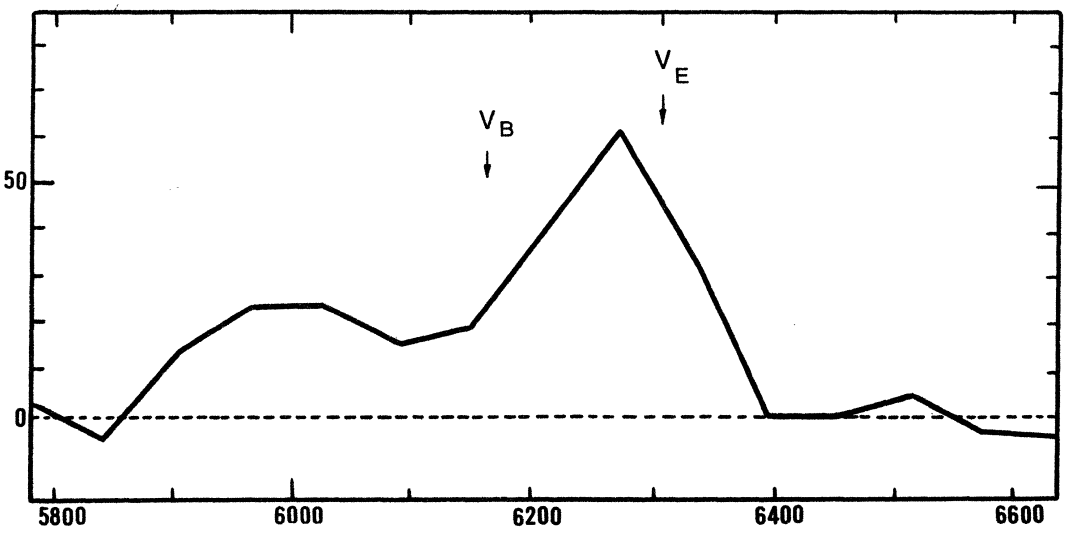

Fig. 3.

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