THE LARGE SKY LENS

R.B. Shatsova, G.B. Anisimova
Southern Federal University
Rostov-on-Don 344090 Russia,
gozha_marina@mail.ru

ABSTRACT. The attention is paid to the lens between the radioloop II and III and to the peculiarities in the disposition of the objects, observed through this lens.

Key words: stellar chemical composition, the ω Cen globular cluster, the Centauri stellar stream, dwarf galaxy evolution.

The sky region between the spur shells (radioloops) II and III ($l \approx 90 - 15^\circ$), having the diameter about 60° and small axis twice and a half smaller, we name the Lens (L) (Fig. 1). Apparently, the shells' intersection also takes place in the space (Fig. 1 in the article Shatsova and Gozha in this volume) at the distances about $100 - 250$ pc. L is turned to us by its edge, located in the Gould belt (GB). The centre of the L-equator proved to be the ascending node of GB on the Milky Way (MW). The spur circle S', connecting the radioloops $I - IV$ centres and perpendicular to GB, according to Shatsova and Anisimova (2002), also passes nearby. A and B vertexes in Fig. 1 are the antipodes of the Loop I centre and the point of its shell, that is the nearest one to the Doradus shell (over GB). The main planes of Perseus and Virgo supergalaxies pass through the same points.

So, L connects the structures of the Galaxy, the Local System and the system of spurs.

The cosmic Lens is irregular. It consists schematically of two spherical layers (of II and III shells), three almost flat intersecting layers (of GB, MW and S') and the gaps between them. The thickness of each layer is several degrees. The layers are filled in by the electron gas, the neutral and ionized hydrogen, natrium, etc, the dust and the stars. One can see it over the radiation and polarization in many frequencies from γ to radio diapasons.

The theoretical examination of the optical features of such conglomerate would be of great interest, if the lensing is effective. It seems to us, it really takes place for the system of objects, observed through L. Here are the examples:

1. The Perseus arm has only one bright region at $l = 90^\circ - 150^\circ$. The light absorption here is even larger, then in the neighbouring regions: $A_V = 0.7$ and 1.2 m kpc^{-1} in comparison to 0.5 and 0.6 according to Efremov (1989). The mean density of stars, having $V < 9^m$ and point IRAS sources at $\lambda = 100\mu$ and 60μ is also 1.5 times larger according to Shatsova and Anisimova (2001). The outlines of the arm region and L coincide in the celestial projection.

2. Near the L centre the supernova Tycho is surrounded by the ring of 10° in radius, consisting of 4 SN, burst out in 369, 902, 1181 and 1667. It means, that 5 from 12 historical SN found themselves near the projection of L centre at the area $< 0.7\,\%$ of the sky. At the same time, the chain, consisting of SN 902 and SN 1181 together with the supernova remnants (SNR) HB3 and G110.3+11.3, is stretched along the upper edge of L, according to Green (2006). Light passes through the diameter of the lens (nearby 150 pc) for 500 years. The interval between dates of registration of flares at pairs (SN 369 – SN 902) and (SN 1181 – SN 1667), and also (SN 1054 – SN 1572) and at a number of others is approximately same. Probably not flares and their reflections by the lens are observed. SNR G 292.0+1.8 and SN 1667 are antipodes on the sky and analogues by the toroidal structure of the escape matter, and also by prevalence of oxygen and neon lines in their spectra (Lozinskaya, 1986).

3. The centres of four OB-associations (Cep OB 3, Cas OB 2, Cas OB 6, Cas OB 8) are situated at the same ring between SN, and four else (Cas OB 1, Cas OB 4, Cas OB 5, Cas OB 7) are inside the ring. The number of stars in six of them is about 20, Humphreys (1978). The most rich complex is Per OB1 at the side of A vertex, and some smaller is the number of stars in Cep1 together with Cep2, near vertex B.

4. The remote open clusters also demonstrate the symmetry elements in a sector of inclined L, according to Dias, Alessi et al. (2002): the ring around the centre and the chains along the projection of shells II and III.

5. The attention was paid to the cepheids – the "twins" on coordinates, periods and velocities (Efremov, 1989).

6. The group of large molecular clouds over Huang, Thaddeus (1986) inscribes into L.

7. The three peak distributions of both 21 cm line

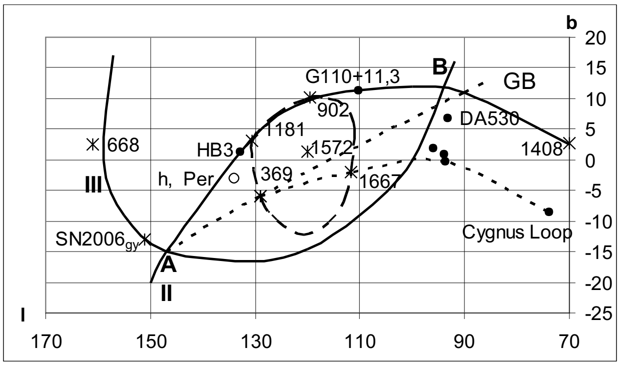

Figure 1: The SN ring around SN Tycho and other objects, observed through the lens L

profiles and the stellar velocity are similar inside L and different outside it, Humphreys (1970).

8. The chain consisting of 8 sources of WMAP catalogue and galaxies of local group NGC 6789, And VII and the pairs (NGC 147 and 185), (And V and X) is stretched along the lower L edge. There is only IC 10 near the centre on the whole L area. The tens of γ-bursts were observed along the whole L perimeter and 4 were inside SN ring, according to Lipunov (2005). Their distances are unknown.

9. Only one extragalactic supernova is near the L centre and about 20 are situated along the perimeter, the majority of them are near A and B points. The lens is projecting on the avoidance zone of galaxies, this only intensify the situation. It is also interesting, that A and B points are situated on the intersection of the zone's border and the main planes of Virgo (B) and Perseus (A) supergalaxies. By the way, the most powerful SN burst was near A point in 2006.

10. The sky cells (3°, 3°), having the largest number of point IRAS sources at the latitude b are situated along the same SR ring, in the centre and along the L perimeter. It shows the places of dust concentration, having the $1.5 - 3$ times contrast.

Perhaps, the number of almost symmetrical images in the mentioned above examples exceeds the number of real objects. It may be the result of the light reflection and refraction in the lens L.

One can also see the other lenses in the sky.

Many notions, based on the observations, can be cardinally changed if we'll take into consideration the lensing in such great scales.

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