NEW RESULTS ON SUPERNOVA REMNANTS*

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Abstract. Estimates of the masses and energies of the supernova explosions that resulted in the Cygnus Loop and similar remnants are revised downward on the basis of recent soft X-ray observations.

(The following summary of Parijskij's report was prepared from the tapes by the Editors.)

I would like to just give some information. Shklovskii (1974) has taken a new point of view about supernova remnants.

Very roughly, the main result of his new research was connected with recent soft X-ray observations. He tried to recalculate once more the mass and energies of, first of all, the Cygnus Loop remnant. His main conclusion is that the old values for mass and energy were overestimated. In the real case the energy is closer to the case of a type I supernova, about 10^{50}–10^{51} erg, and the mass is comparable with 1 $M_{\odot}$. Moreover, he tried to consider other supernovae of that type, IC 443, Tycho, and Vela 10, for example. His feeling is that they are also closer to type I supernovae. The masses of the envelopes of the Cygnus Loop and also these supernovae are $\sim 1\ M_{\odot}$. Practically all these sources have some kind of pulsar inside, a radio pulsar or an X-ray point source, which Shklovskii suggests is just the situation when the axis of the magnetic field of the pulsar or neutron star is oriented in the proper way. So by a combination of these two facts he came to the conclusion that the total mass of the exploding original star is not very high, a few solar masses, and again it supports his feeling that for the majority of well-known supernova remnants, the supernova belongs to type I, or closer to type I than type II.

There is a by-product of this consideration. He stresses greatly that there should be a strong selection effect. According to his approach the lifetime of supernova shells or remnants which exploded in dense regions of the Galaxy will be larger than those sources which exploded at higher latitude. So the statement that many supernova shells belong to the extreme flat population of original stars should be considered once more with that kind of selection effect taken into account.

Reference

Shklovskii, I. S.: 1974, *Astron. Zh.* **51**, 3 (= *Soviet Astron.* **18**, 1).

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DISCUSSION

Mills: In preparing my review I looked for some indication of differences between the radio properties of type II and known type I SN, but could not find anything significant. However, if all those suggested by Shklovskii are actually type I, I note that these are all well below the average $\Sigma - D$ relation.

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