For comparison we note that

$$\frac{u_g}{u_n} \sim \frac{\Lambda}{\epsilon_F}\left(\frac{\omega L}{s\gamma}\right)^2$$

(u_n is the amplitude of the wave produced under the action of the ponderomotive force). In Bi we have $\Lambda/\epsilon_F \sim 100$ [6], and at helium temperatures and $\omega \sim 10^7$ Hz and $H_0 \sim 100$ Oe we have $\omega L/s\gamma \sim 1$. Consequently, under these conditions (corresponding to the experimental conditions in [1, 2]), the main mechanism of excitation of sound is the deformation mechanism. The amplitude of the acoustic resonance, which is proportional to u_g^2, should vary like H_0^2, and its temperature dependence is determined by the temperature variation of the quantity τ^2T^2. Since violation of the equilibrium distribution of the electrons between the valleys is possible only if $T \gg \tau$, the mechanism in question can appear only at temperatures where the momentum of the thermal phonon is much smaller than the intervalley distance in p-space. For Bi, these temperatures are << 30°K.

As noted above, the redistribution of the carriers can occur in the absence of a constant magnetic field, provided the conductivities of the electrons of individual valleys are anisotropic. In this case, however, the amplitude of the excited sound depends strongly on the anisotropy of the electron spectrum and is much smaller in value. A detailed calculation and analysis of the experimental data will be published separately.

The authors are grateful to V.F. Gantmakher and E.I. Rashba for fruitful discussions.

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UPPER LIMITS OF LUMINOSITY OF CERTAIN EXTRAGALACTIC OBJECTS IN THE HARD γ-RAY REGION

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ZhETF Pis. Red. 13, No. 10, 566 - 569 (20 May 1971)

In recent investigations of certain extragalactic objects (nuclei of Seyfert and N galaxies, quasars), unexpected important results were obtained. In particular, intense infrared radiation of a number of sources was discovered [1, 2], and their variability in the optical and radio bands was observed [3]. A study of the processes occurring in such objects is of great interest both for the understanding of the physics of the processes and for the elucidation of the role of these objects in cosmology, particularly their contribution to the background metagalactic electromagnetic radiation in different energy bands. Information concerning the radiation of such sources in the hard γ-ray band

($E_\gamma \gtrsim 10^7$ eV) are very skimpy (see, e.g., [4 - 7]). Therefore even the determination of the upper limits of their luminosity in γ rays is of considerable interest.

A scintillation-Cerenkov γ telescope, intended for the registration of γ quanta with energies $E_\gamma \gtrsim 30$ MeV, was installed on the satellite "Kosmos-208." In 152 hours of operation, this instrument registered 186 events interpreted as γ quanta having these energies. It was established that most of these events were due to imitations produced by charged particles. Therefore the γ fluxes determined from these data can be regarded only as upper limits [8].

The reduction of the primary experimental results consisted of determining the time of observation T and the number of registered events n ($E_\gamma = 30$ - 150 MeV) for sources viewed by the telescope during the time of flight (a list of sources is given in the table). To this end, a region of space defined by the finite angular resolution of the instrument, was separated in the vicinity of each source; the half-aperture angle of the telescope cone was about 17°. The time T and the events n connected with the separated region were ascribed in their entirety to the given source. If the regions for different sources overlapped, then the same events and the same time intervals were ascribed to different forces. All the registered events were taken into account, regardless of their nature (γ quanta from the source, from the isotropic background, or from the disk of the galaxy; imitations of charged particles). The values of T and n determined in this manner for different sources are listed in the table.

The average efficiency of registration of the instrument for γ rays with energies 30 - 150 MeV was 10%. It can be shown that in the case when the telescope scanned with sufficient uniformity the entire region in the vicinity of the source, the effective area of the detectors of the telescope was $S_{eff} \simeq (1/3)S_0 \simeq 17$ cm^2 ($S_0 = 50$ cm^2 is the area corresponding to normal incidence of the radiation on the telescope). For the calculation of the upper limits of the γ-ray fluxes I_γ listed in the table we assumed values n(95%) corresponding to the upper limits of the values of n with a confidence level of 95%. The same table indicates the energy fluxes W_γ in the region $E_\gamma = 30$ - 150 MeV, determined with allowance for the distances R to the sources (these values of R correspond to a Hall constant H = 75 km/sec-Mpsec). It can be noted that the

Source	R, cm	T, sec	n_γ (30 – 150 MeV)	n_γ(95%)	I_γ, cm^{-2}sec^{-1}	W_γ, erg/sec
3C-458	$1.32 \cdot 10^{25}$	$6,1 \cdot 10^{4}$	5	10.5	$1.0 \cdot 10^{-4}$	$2 \cdot 10^{43}$
M-82	$1.32 \cdot 10^{25}$	$9.0 \cdot 10^{3}$	4	9.2	$6.0 \cdot 10^{-4}$	$1 \cdot 10^{44}$
3C-273	$1,94 \cdot 10^{27}$	$3,6 \cdot 10^{4}$	5	10.5	$1,7 \cdot 10^{-4}$	$7 \cdot 10^{47}$
NGC-5236	$1.32 \cdot 10^{25}$	$4.4 \cdot 10^{4}$	13	20.7	$2,8 \cdot 10^{-4}$	$6 \cdot 10^{43}$
A-Centauri	$1,26 \cdot 10^{25}$	$5.6 \cdot 10^{4}$	19	27.9	$2,9 \cdot 10^{-4}$	$5 \cdot 10^{43}$
M-87	$3.70 \cdot 10^{25}$	$2.6 \cdot 10^{4}$	5	10.5	$2.4 \cdot 10^{-4}$	$4 \cdot 10^{44}$
NGC-1275	$2.16 \cdot 10^{26}$	$2.6 \cdot 10^{4}$	20	29.1	$6,6 \cdot 10^{-4}$	$4 \cdot 10^{46}$
NGC-2782	$1.00 \cdot 10^{26}$	$6.0 \cdot 10^{4}$	20	29.1	$2.9 \cdot 10^{-4}$	$3 \cdot 10^{45}$
NGC-4151	$4.00 \cdot 10^{25}$	$4.9 \cdot 10^{3}$	0	3.0	$3.6 \cdot 10^{-4}$	$7 \cdot 10^{44}$
NGC-7469	$2.10 \cdot 10^{26}$	$5.9 \cdot 10^{4}$	5	10.5	$1.0 \cdot 10^{-4}$	$5 \cdot 10^{45}$
NGC-7714	$1.20 \cdot 10^{26}$	$6,0 \cdot 10^{4}$	5	10.5	$1.0 \cdot 10^{-4}$	$2 \cdot 10^{45}$

relatively high limit of γ-ray luminosity of the source 3C-273 is apparently connected with the large value of R for this object, for even at $n = 0$ (and accordingly $n(95\%) = 3$) the value of W_γ will have the same order of magnitude.

The upper limit of the average γ-ray luminosity for infrared galaxies W_γ, can also be indirectly estimated from the intensity of the isotropic background of the hard γ rays F_γ [8] and the average density of these objects N. At the present time it is impossible to determine exactly the value of N from observations, but estimates by Burbidge [9] show that the number of powerful infrared galaxies possibly amounts to about 1% of the number of all galaxies. In order of magnitude, $N \sim R^{-3}$, where R is the distance from the nearest infrared galaxies. Then $W_\gamma \lesssim 4\pi F_\gamma H/cN \lesssim 10^{42}$ erg/sec. In this case the experimental values of W_γ do not contradict the assumption that the isotropic background of the hard γ rays is due to emission of infrared galaxies. In spite of the fact that the obtained upper limits of W_γ are relatively high, it should be noted that for all the sources these quantities do not exceed the power of the infrared radiation [1]. Such a situation does not agree with the Low hypothesis concerning the annihilation nature of infrared radiation of such objects [2]. It was assumed there that the infrared radiation is synchrotron radiation of the electrons and positrons produced upon annihilation of nucleons and antinucleons. The power of the γ radiation in the energy region $\sim$100 MeV, in the case of such a mechanism, would exceed at least by a factor of 2 the power of the infrared radiation (see, e.g., [10]).

The authors are sincerely grateful to R.A. Syunyaev, at whose initiative this attempt to use the experimental results obtained with the "Kosmos-208" was undertaken for the determination of the upper limits of the luminosity of the indicated objects in γ rays.

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LOW TEMPERATURE ELECTRIC CONDUCTIVITY OF METALS WITH OPEN FERMI SURFACES

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Submitted 5 April 1971
ZhETF Pis. Red. 13, No. 10, 569 - 572 (20 May 1971)

The present paper is devoted to the development of the theory of lattice resistance of pure metals at low temperatures, with account taken of the dragging of the phonons by the electrons.