ations are determined by the nearest neighbor (pair collisions). Recognizing that the cross section of the pair collisions is in this case the squre of the distance between particles ($\sim n^{-2/3}$), and using the relation $\gamma = n\sigma s$, we obtain Eq. (12).

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IRREVERSIBILITY OF TRANSITION OF NMR SIGNALS THROUGH A WEAK FIELD IN SOME MOLECULAR CRYSTALS

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Proton magnetic resonance signals in molecular crystals are characterized by a small spin-spin relaxation time ($T_2 < 10^{-3}$ sec) and a large spin-lattice relaxation time ($T_1 \geq 10$ sec). It is known [1,2,3] that the condition $T_2 \ll T_1$ is necessary for the existence of a spin temperature in the nuclear-spin system of the sample. The existence of a spin temperature $T_s(H)$ at arbitrary values of the constant field H was previously [1] demonstrated indirectly by means of an experiment wherein a sample was demagnetized in a weak (terrestrial) field: the sample in which the spin system has already assumed the lattice temperature was moved from the magnet gap to the terrestrial field and returned to the gap after a time t ($T_2 \ll t \ll T_1$). No change in the signal was noted at all. The reversibility of the transition through a weak field served as one of the arguments in favor of the existence of a spin temperature $T_s(H)$ in LiF crystals.

We performed a similar experiment with naphthalene single crustals. The transition through a weak field turned out to be irreversible for the NMR signal: a time $t \approx 1$ turned out to be sufficient for total disorientation of the nuclear spins in these crystals; subsequent establishment of the equilibrium magnetization and a corresponding growth of the NMR signal occurred, as in the initial magnetization, with a time constant $\tau \sim 10^3$ sec.

Neither variation of the intensity of the rf field H_1 over a wide range, nor defects in the crystal lattice, have any influence on this effect. The behavior of the NMR signal in anthracene and biphenyl was similar.

Control experiments with molecular crystals and polymers whose molecules contain no closed electron delocalization loops or have additional intramolecular degrees of freedom (paradichlorobenzene, hexamethylbenzene, oxyacetate of beryllium, paraffin, polyethylene, etc.) disclosed full reversibility of the transition of the NMR signal through a weak field.

The observed irreversibility of the transition of the NMR signal through a weak field indicates that in fields $H \gg H_{loc}$ (H_{loc} = local magnetic fields) the condition $T_2 \ll T_1$ is not sufficient for the existence of a spin temperature in fields with $H < H_{loc}$.

The effect observed by us can be qualitatively treated as an indication that in our samples of naphthalene, biphenyl, and anthracene energy is effectively pumped out from the nuclear-spin system into the lattice when $H < H_{loc}$. A theoretical and experimental study of this effect is being continued.

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EXCITATION OF STANDING SOUND WAVES IN Bi BY AN ELECTROMAGNETIC METHOD

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We report here the results of preliminary experiments in which we observed excitation of sound in Bi by an electromagnetic wave incident on its surface.

The Bi sample constituted single crystals in the form of discs (18 mm dia, thickness $d \sim 1$ mm). They were placed inside an inductance coil, with which they were cooled to helium temperatures, at which the electron mean free path in the samples reached 0.5 mm. The coil together with the sample served as the inductance of the tank circuit of an rf oscillator placed on the upper cover of the Dewar. In addition to the coil and a fixed capacitor, the circuit included a blocked semiconductor diode. The dependence of the barrier capacitance of its p-n junction on the blocking voltage made it possible to vary smoothly the oscillation frequency, and also to modulate it sinusoidally at a frequency $\varphi = 19$ Hz. The oscillator output was detected and fed to a narrow-band amplifier with synchronous detector, tuned to double the modulation frequency 2φ. As a result, the output signal was proportional to $\partial^2R/\partial f^2$ (R = real part of Bi sample surface impedance). The dependence of $\partial^2R/\partial f^2$ on f was investigated in the interval 1 - 10 MHz. The skin depth at these frequencies was of the order of 10^{-3} cm.

In magnetic fields on the order of 10 - 100 Oe and parallel to the coil axis, a group