to cause rotation of σ_s in $YFeO_3$ it is necessary to overcome an effective anisotropy field H_A on the order of 10^5 Oe. Such a value of H_A indicates a negligible amplification in the domains (since it is proportional to H_L/H_A).

When the features of the NMR in $YFeO_3$ are considered in their entirety, it can be assumed that the results constitute the first experimental confirmation of the possible appearance of nuclear resonance, predicted theoretically in [5], at a frequency corresponding to NMR in the domains, but observed on the nuclei in the domain boundaries together with the "interboundary" resonant signal. In this case the contradictions between the results are eliminated.

Further information on the nature of the NMR of Fe^{57} in $YFeO_3$ can be obtained from investigations now being carried out on crystals with different orientations relative to h and to the external static field.

[1] M.E. Bibschutz, S. Shtrikman, and D. Treves, Phys. Rev. 156, 562 (1967).
[2] A.O. Gossard, V. Jaccarino, and J.P. Remeika, J. Appl. Phys. Suppl. 33, 1187 (1962); A. Narath, Phys. Rev. 140, A854 (1965).
[3] I.M. Winter, Phys. Rev. 124, 542 (1961).
[4] E.A. Turov and M.P. Petrov, Yadernyi magnitnyi rezonans v ferro- i antiferromagnetikakh (Nuclear and Magnetic Resonance in Ferro- and Antiferromagnets), Nauka, 1969.
[5] E.A. Turov, A.P. Tankeev, and M.I. Kurkin, Fiz. Met. Metallov. 28, 385 (1969); 29, 748 (1970).

MOSSBAUER EFFECT IN THE COMPOUNDS Pt_3Cr AND Au_4Mn

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It is well known [1, 2] that experimental searches for nonconservation of time parity in electromagnetic nuclear transitions can be carried out with the aid of the Mossbauer procedure, which makes it possible to obtain elliptically-polarized γ radiation in transitions between the magnetic sublevels of the excited and ground states of the nucleus (m_i, m_f). The parity-nonconservation effect should become manifest in a change of the orientation of the axes of the polarization ellipse, both when tuning to the component with opposite signs of m_i and m_f and when the sign of the magnetic field at the radiation-source nuclei is reversed.

Since not all elements have compounds with magnetic structures, such experiments are performed by introducing the investigated nuclei (source and absorber) as impurities in an iron lattice. This leads, however, to a large loss of intensity of the low-energy γ radiation, owing to photoelectric absorption. This is an undesirable consequence of the fact that in order to attain the required level of sensitivity to the effect it is necessary to obtain a statistical accuracy much better than 10^{-3}.

The investigated substance was Au^{197}, in which there is a 77.3-keV Mossbauer transition of mixed multipolarity. To reduce the photoabsorption to a minimum, we used a ferromagnetic gold compound for the absorber and a Pt^{196} compound, obtained by neutron bombardment, as the source.

At present there is only one known ferromagnetic gold compound with a Curie point higher than 78°K, namely Au_4Mn ($T_c \sim 90°$ [3]). In addition, we attempted to choose a platinum compound such that the hyperfine splitting and the isomer level shift of the gold nuclei produced in this compound following the β decay would permit an analysis of the polarized γ radiation at zero source velocity relative to the absorber. The change of the orientation

of the polarization-ellipse axes, due to T-parity nonconservation, would occur only when the sign of the magnetic field at the source nuclei is reversed. Such a procedure makes it possible to avoid a number of phenomena imitating the useful effect, viz., the change of the geometry when the velocity is changed to a value corresponding to a line with opposite m_i and m_f, differences in the populations of nuclear sublevels, etc.

The object of the investigation was chosen to be the ferromagnetic alloy Pt_3C_r [4]. Another known ferromagnetic alloy, Re_3Pt, was rejected by us since it is a magnetically rigid material, and this would raise additional difficulties in performing such an experiment.

The Pt_3Cr alloy was made of platinum containing 92% of Pt^{196}.

The resonance-absorption spectra were obtained at 78°K using an electrodynamic vibrator with a feedback system.

The main results of the epxeriment are listed in the table.

	$Pt_3Cr - Au$	$Pt - Au_4Mn$
Isomer shift, mm	-9.7 ± 1.0	-2.8 ± 0.3
$10^6 \cdot H_{ext}$, G	1.3 ± 0.1	0.87 ± 0.07

An analysis of the results with allowance for the relative isomer shift of the Pt-Au pair (-1.2 mm) shows that Pt_3Cr and Au_4Mn satisfy the imposed requirements, and that when the relative velocity of the two is zero, the polarized γ radiation of the source, corresponding to transitions from the sublevel $m_i = -1/2$, will experience resonant scattering in the absorber.

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[1] O. Kistner, Phys. Rev. Lett. 19, 872 (1967).
[2] M. Atac, B. Christman, P. Debrunner, and H. Frauenfelder, Phys. Rev. Lett. 20, 691 (1968).
[3] M. Matsumoto, T. Kaneco, and K. Kamigaki, J. Phys. Soc. Japan 24, 953 (1968).
[4] S. Pickart and R. Nathans, J. Appl. Phys. 34, 1203 (1963).

LASER OPERATING IN THE VACUUM REGION OF THE SPECTRUM BY EXCITATION OF LIQUID XENON WITH AN ELECTRON BEAM

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The use of condensed noble elements (Xe, Kr, Ar, Ne, He) for lasing in the region of the vacuum ultraviolet was proposed and discussed in [1, 2]. The development of a laser using condensed inert gases is made easier by the feasibility of realizing a four-level scheme [3].