$$(\epsilon_{\mathrm{res}})_{m_2\sigma} = -\Psi_{m_2}\frac{\frac{1}{2}\left(\frac{m_2\gamma_{1\sigma}}{\lambda}\right)^2}{8+2\left(\frac{\omega}{\lambda}\right)^2+\left(\frac{m_2\gamma_{1\sigma}}{\lambda}\right)^2}.$$

Thus, the experimentally observed resonant singularity in the behavior of the coefficient of the thermal conductivity of O_2 agrees with the theory. This confirms the correctness of the choice of the employed model of molecule collision.

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CONCENTRIC DOMAINS IN SINGLE-CRYSTAL ORTHOFERRITES

A.V. Antonov, A.M. Balbashov, V.A. Baltinskii, and A.Ya. Chervonenkis
Moscow Power Institute
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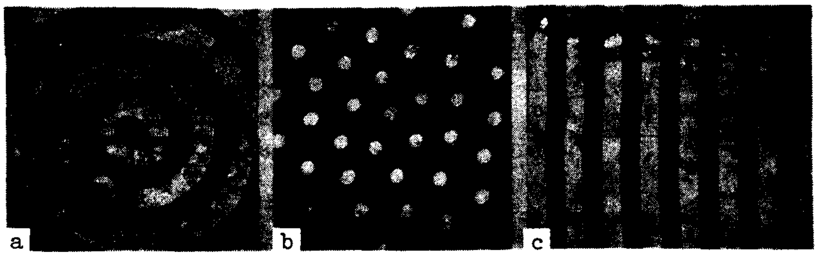
It is known that in single-crystal plates of orthoferrites cut normal to the "c" axis one can observe, besides strip domains, also a system of cylindrical domains [1]. Under certain conditions, the so-called ring domains [2] are obtained. We shall show below that all the modifications of domain configurations observed in orthoferrites can be regarded as a particular case of a regular domain structure consisting of a system of concentric ring domains (Fig. a).

The picture shown in this figure was obtained with a highly perfected $TmFeO_3$ plate measuring 7 × 10 mm and 60 μ thick. At the center of the picture is a cylindrical domain, stable in fields from $H = 0$ to $H = H_{cr}$, where H_{cr} is the collapse field. Thus, in the structure under consideration the range of stability of the cylindrical domains is much higher than in the known structures



Regular domain structure in single-crystal plate of $TmFeO_3$ (50×): a - system of concentric domains, $H = 0$; b - close-packed system of cylindrical domains, $H = 30$ Oe; c - system of parallel strip domains, $H = 0$.

(Fig. b), where there exists also a lower limit of the stability range [1]. On the periphery (Fig. a), one sees ring domains of large diameter, which are identical to the strip domain structure as $R \to \infty$ (Fig. c).

When an external magnetic field $H > H_{cr}$ is applied to the plate with the concentric domain structure (Fig. a), the cylindrical domain collapses, and the ring that follows it contracts towards the center and collapses into a cylinder; the field required for the collapse is $H'_{cr} > H_{cr}$. A gradual increase of the field is accompanied by a contraction of the peripheral rings towards the center. At a certain field on the plate, a single annular domain remains, the properties of which are analogous to those investigated in [2].

The regular domain structures shown in Figs. a - c, and readily realized in large and low-coercivity orthoferrite plates, constitute diffraction gratings of different types for transmitted polarized light. The application of a sinusoidal magnetic field makes it possible to modulate the period of such gratings. Owing to the high domain-wall mobility of orthoferrites, modulation of this type is possible up to the megahertz range.

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CHANGES IN THE SPECTRUM OF BACK-REFLECTED RADIATION IN LASER HEATING OF A PLASMA

A.R. Zaritskii, S.D. Zakharov, P.G. Kryukov, Yu.A. Matveets, and A.I. Fedosimov
P.N. Lebedev Physics Institute, USSR Academy of Sciences
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It is known that when a plasma is heated by powerful laser radiation and solid targets are used, the laser light is strongly reflected backward [1 - 2]. Such a reflection is the optical analog of microwave cutoff for low-density plasmas (see, for example, [3]). In the case of laser heating, the fraction of the reflected-light energy may reach 30 - 50% of the incident energy [4 - 5].

We have undertaken measurements of the spectrum of the laser light reflected from a plasma. The targets used were LiD, $(CH_2)_n$, $(CD_2)_n$, D_2O ice, and aluminum. The source was a mode-locked Nd laser consisting of a driving generator and a six-stage amplifier. The plasma heating and the spectral measurements were performed both at the fundamental frequency ($\lambda = 1.06\ \mu$) and at the second harmonic frequency ($\lambda = 0.53\ \mu$). Conversion into the harmonic, with efficiency up to 50%, was effected with the aid of a KDP crystal.

To increase the accuracy of the spectral analysis, the initial generation spectrum was narrowed down to ≤ 0.05 Å by introducing axial-mode selectors of the Fabry-Perot interferometer type into the resonator. The laser pulse was then lengthened to 1 nsec. The output energy per pulse at the fundamental frequency reached 20 J, and the radiation divergence was 2×10^{-4} rad at a beam diameter 4 cm. The laser light was focused on the target by an objective having a focal length $f = 4.5$ cm, and in some cases by a lens having $f = 30$ cm. The transmission of the objective and of the window of the vacuum chamber was 60% at $\lambda = 0.53\ \mu$, and the diameter of the focal spot in the absence of a plasma was estimated at 20 - 30 μ ($f = 4.5$ cm).