Conclusion. From the above analysis, we can understand that amplitude modulation is a process of shifting a low frequency modulating signal into the sideband of a high frequency carrier. Obviously, in AM waves, the carrier does not contain any useful information. Information is only included in the sidebands.

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STUDY WETTING ACTIVITY SILICONES IN THE PRESENCE OF SURFACTANTS

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The influence of surfactant (technical product «Dispersant Telaz D») on the wetting of metal substrates with a silicon solution. It is shown that the surfactant improves the wetting of the metallic substrate wetting ability, and silicone fluids are closely correlated with their dispersant activity.

Silicone lacquer paint materials historically occupy a significant market share of coatings. Their quality of coatings depends largely on the degree of dispersion of their component pigments. Effective process for dispersing pigments, a great importance is the ability of the pigmented particles wetted components of the liquid dispersion medium. The purpose was to study the effect of surfactants (hereinafter SAS) wetting metallopigment. As the surfactant used technical condensation product of vegetable oils with diamines under the trademark «Dispersant Telaz D» (molecular weight – 2121 amu; amine number (HCI mg/g) – 32), the manufacturer of «Avtokoninvest», Russia.

It has been established that the layer was formed on an aluminum substrate with toluene at the boundary with the water is hydrophobic, the contact angle is equal to 116,3°. In contrast, the interfacial layer, which was formed in the presence of surfactants, had a completely different surface properties (possessed significantly lower hydrophobicity). Since the introduction of surfactant in toluene, water contact angles of metals decreased by 12–15°. With the introduction of surfactant in dilute solutions of resin content (10 % silicones), water contact angles decreased by 8–12°. Change in the interaction with the surface of the pigment wetting liquid, as a result of adsorption of surfactants, can be determined by changing the values of «relative work of wetting». In assessing this parameter is set, that the introduction of surfactant is increased wetting of metal substrates solutions silicones. Established patterns of change in the wetting activity are closely correlated with changes in patterns of dispersion metallopigment.

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CHARACTERES OF TWO COMPONENT CRYSTALOPTICAL SYSTEMS

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An analysis and synthesis of difficult optical elements from anisotropic crystals are of interest for the construction of laser measuring devices. Thus there is a task of development of methodology of calculation of such elements, that more precisely would describe their properties on passing and interference of hertzian waves. The co-version method of Ph. I (is known). Fyodor for the calculation of distribution of electro-magnetic waves in anisotropic environments. However this method results in difficult general expressions, and his use for ДКЭ is difficult. On the whole a task is not accessible to the strict analytical decision, thus basic difficulty is; in the necessity to take into account out-of-parallelism of wave vector to $k = 2\pi/\lambda$, describing transfer of phase of wave, and radial vector $\vec{s} = [\vec{E}, \vec{H}]$, describing transfer of energy of wave (λ – the length of wave, E, H – vectors of interesting of elliptic and magnetic fields.

The structural features of worked out DKE are below given: DP 1 (Fig. 1), BL (Fig. 2). The prisms of type of DPPUD differ in that at normal incidence-fission of wave on the exit of prism is absent, but here maximal sensitiveness of «doubling» between o- and e-waves is achieved in relation to angle of incidence. The first variant of prism (DPPUD-1) is presented on Fig. 1. The plane of optical axes is perpendicular an entrance and output to the verges of prism and parallel to the rib of prism.

For a wave, falling inplane, containing optical axes, at any angles of incidence on the exit of DPPUD formed two o- and e-waves with the ortogonal state of пpolarization. Basic descriptions of DPPUD, measureable on experience, are doubling angle y between o- and e-rays on the exit of prism and angle of rejection of x came from the prism of e-ray from the plane of incidence. Calculation sizes y and x for DPPUD Д-1 determined on formulas:

$$\gamma_1 = \delta \frac{\sqrt{n_e^z - \sin^2\alpha}\ \mathrm{tg}\alpha\ \sin\beta\,\mathrm{tg}\theta\sqrt{\sin^2\alpha\cos^2\beta + \cos^2\alpha}}{\sin\alpha\cos\beta\,\mathrm{tg}\theta + \sqrt{n_e^z - \sin^2\alpha}}; \quad (1)$$

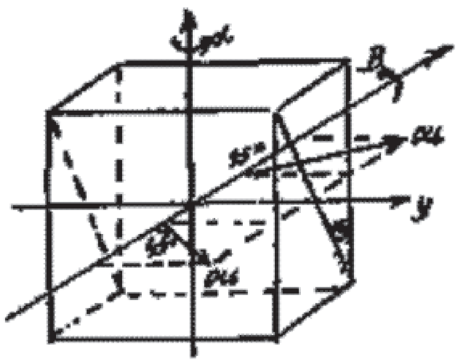
$$x_1 = \delta \frac{\sqrt{n_e^z - \sin^2\alpha}\ \sin\alpha\ \sin^2\beta\,\mathrm{tg}\theta}{\sin\alpha\cos\beta\,\mathrm{tg}\theta + \sqrt{n_e^z - \sin^2\alpha}}, \quad (2)$$

where δ – parameter of trifle $\left(\delta = \frac{n_o^2 - n_e^2}{n_o^2}\right)$; n, n_e – main indexes of refraction of o- and e-waves; θ – deflectable angle of wedge of prism; β – azimuth angle, characterizing the turn of DPPUD about axis of z, the flat spreads along thatwave; α – angle of incidence on the entrance verge of prism, equal to the angle of turn of DPPUD around axis x.

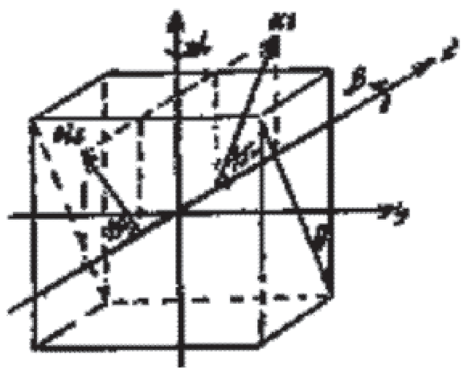
The second variant of prism (DPPUD-2) is presented on a Fig. 1, 6. The plane of optical axes is perpendicular to an entrance and output to the verges, and also rib of prism. Here in this case we get:

$$\gamma_2 = \delta \frac{\sqrt{n_e^z - \sin^2\alpha}\ \mathrm{tg}\alpha\,\mathrm{tg}\theta\cos\beta\sqrt{\cos^2\alpha + \sin^2\alpha\cos^2\beta}}{\sin\alpha\cos\beta\,\mathrm{tg}\theta + \sqrt{n_e^z - \sin^2\alpha}}; \quad (3)$$

$$x_2 = \delta \frac{\sqrt{n_e^z - \sin^2\alpha}\ \sin\alpha\,\mathrm{tg}\theta\ \cos\beta\ \sin\beta}{\sin\alpha\cos\beta\,\mathrm{tg}\theta + \sqrt{n_e^z - \sin^2\alpha}}. \quad (4)$$



a



b

Fig. 1. Construction of двупремляющих prisms of variable angle of doubling of type of DPPUD – 1 (a) and DPPUD (b)

If a falling wave lies inplane optical axes at any angles of incidence, that takes place at ($\beta = 0$, then breaking (up «doubling») on an exit takes place in plane of incidence, i.e. $x_2 = 0$. If a wave falls in of, planes of optical axes, then breaking up is absent, as well as in case of DPPUD of Dependence of kind (1)–(4) are in a good consent with experimental facts and can be used for drafting of algorithms for COMPUTER in the systems of operation of a laser ray.

Properties of other element (BL) are described in works. Calculation of DKE of type of B.L., conducted on methodology, and explained on Fig. 2, c.

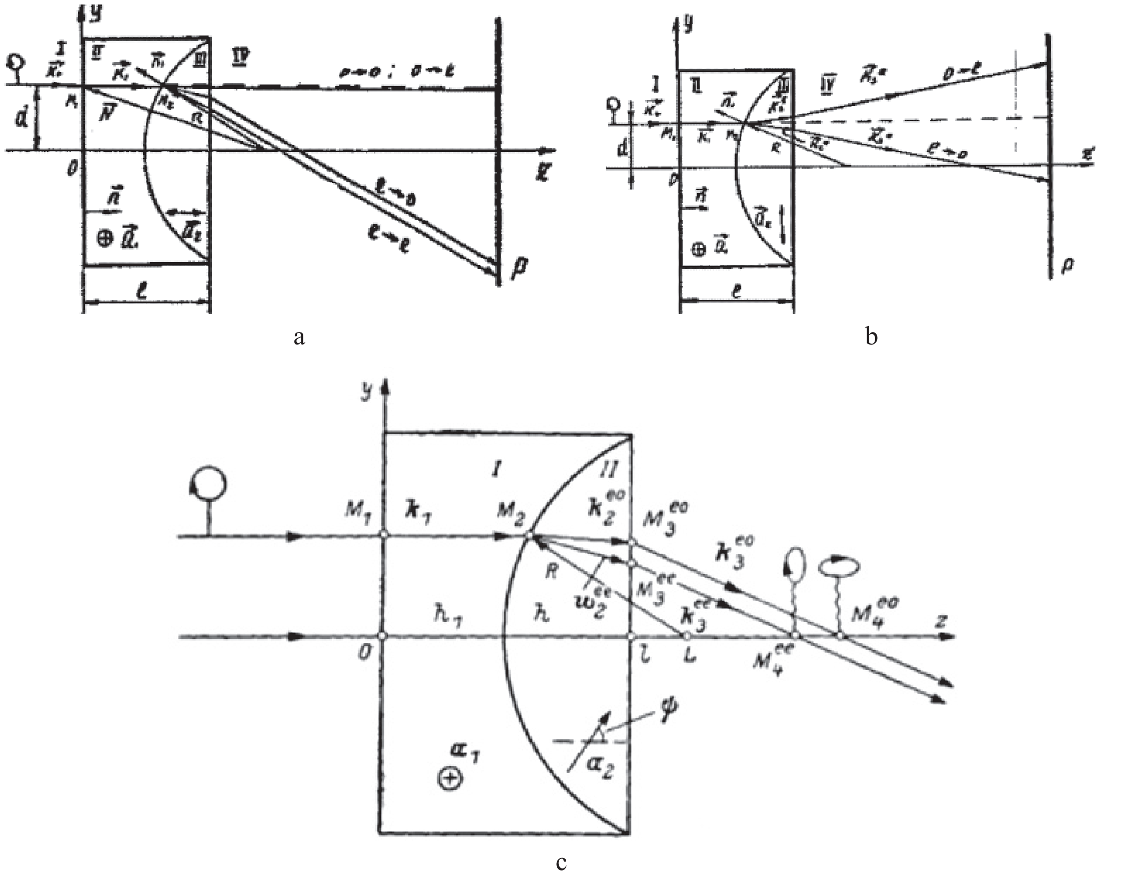


Fig. 2. Constructions of bifocal lenses of type of BL-1 (a) and BL-2 (b) and chart of motion of rays in them (c)

Let in the circular polarized wave spreads in the direction of axis z. At such choice of the state of polarization of falling wave «attachment» of vector of polarization to the optical axis of crystal on the entrance of BL appears unimportant, that allows in future to unite the construction of theory for the lenses of type of BL-1 and BL-2. Let $z = 0$ жэне $z = \ell$ are left and right to the verge of BL accordingly, and spherical border is set with equation $x^2 + y^2$..., where –distance from the beginning of the system of coordinates to the center of spherical surface of БЛ. Directions of optical axes in the areas of I and II are set by the unit vectors of a1 –(1,0,0) and oh, $= x^2 + y^2 + (z - \delta)^2 = R^2$, where δ – corner between BL and axis 2 (Fig. 2, c). Let (on the left verge of БЛ in the arbitrary point of M_1 the narrow parallel beam of light falls along an axis. The point of M_1 has coordinates of $d\cos\varphi$, $d\sin\varphi$, 0, where φ – angle between the axis of x and radius-vector, conducted from beginning of coordinates z to the point M. Will suppose $d \ll R$ To, where R – radius of curvature of spherical border of division of BL, size $(d/R)^2$ is scorned small. The index of refraction for o-wave in the areas of I and II is identical and equal h_0, and for a e-wave depends on $\vec{k}_i$ $(i = 1, 2)$ – single wavy vector in the areas of I and II accordingly. In area of K_1, (1) coincides with direction of light ray. There is mutual transformation of o- and e-волн on the spherical border of division of БЛ. Wave vector $\vec{k}_2$ in area of. II lies in plane, passing through an axis z and determined by an angle φ: $\vec{k}_2 = (\sin\alpha_2\cos\varphi,\ \sin\alpha_2\sin\varphi,\ \cos\alpha_2)$, where aг is an angle between $\vec{k}_2$ and by an axis z. On a spherical border in general case four waves must be considered and according to them four border conditions.

Thus the vector of $\vec{k}_2$ and angle of α_2 must add indexes (oo), (oe), (eo), meaning: (oo) and (ee) – keeping of type of polarization of wave; (oe) and (eo) transformation of falling o-wave in the refracted e-wave and vice versa. Thus $\alpha_2^{oo} = 0$, and angle α_2^{oe} can be found from the law of refraction on a spherical surface:

$$n_0^2 \cdot \left[1 - \left(\vec{k}_1, \vec{n}_1\right)^2\right] = \frac{n_e^2}{\left[1 + \delta\left(\vec{k}_2^{\,oe}, d_2\right)^2\right]}\left[1 - \left(\vec{n}_1, \vec{k}_2^{\,oe}\right)^2\right], \qquad (5)$$

where I $\vec{n}_1 = \left(\frac{d}{R}\cos\varphi, \frac{d}{R}\sin\varphi, -\sqrt{1-\frac{d^2}{R^2}}\right)$ – single vector of normality. Intersection shining with the spherical border of division has coordinates $\left(d\cos\varphi, d\sin\varphi, \sigma-\sqrt{R^2-d^2}\right)$. Putting in (5) values of vectors of $\vec{n}_1, \vec{k}_1, \vec{k}_2^{oe}$ and ar we will get the angles of $\alpha_2^{oe}, \alpha_2^{eo}, \alpha_2^{ee}$.

Wave vector of ray going out from BL, we will write down in a kind $\vec{k}_3 = (\sin\alpha_3\cos\phi\,\sin\alpha_3, \sin\phi, \cos\alpha_3)$ Obviously, that $\alpha_3^{oo} = 0$ and law of refraction (eo) of wave on the border of z = ℓ will look like :

$$n_0^2 = [1-(\vec{n}_1, \vec{k}_2^{eo})^2] = 1-(\vec{n}_2, \vec{k}_3^{eo})^2, \qquad (6)$$

where $\vec{n}_2 = (0,0,1)$ – is a normal to the plane of $z = e$. From (6) will we get angles $\alpha_3^{eo}, \alpha_3^{oe}, \alpha_3^{ee}$.

For being of e-ray in area of II it is required to consider single vector of group speed on correlation of $\vec{S} = \mu_1\vec{\alpha}_2 + \mu_2\vec{k}_2$, where μ_1,μ_2-coefficients. It is necessary to angle between in an anisotropic environment. It is possible to show that expression for $\vec{S}$ describing the trajectory of e-ray in BL. looks like

$$\vec{S} = \frac{(n_e^2 - n_0^2)(\vec{k}_2, \vec{\alpha}_2)\vec{d}_2 + n_0^2\vec{k}_2}{\sqrt{n_e^4(\vec{k}_2,\vec{\alpha}_2)^2 + n_0^4[1-(\vec{k}_2,\vec{\alpha}_2)^2]}}. \qquad (7)$$

Case of $\psi = 0$ suits to element of type of BL-1 (Fig. 2, a), and $\psi = \frac{\pi}{2}$ – element of type BL-2 (Fig. 2, b). For the Icelandic spar $n_o > n_e$ and $\psi = \frac{\pi}{2}$ – we have $\alpha_3^{oe} > 0$. This means that o-ray going to the environment of II on leaving from BL-2 walks away from the axis of *Z*; consequently, falling on BL-2 a parallel bunch with this polarization will be going (Fig. 2, c) away. For (eo) – and (ee) – rays at $\psi = 0$ (in BL-1) we have: $\alpha_3^{oe} > 0$ and $\alpha_3^{ee} < 0$.

Consequently, (eo) – and (ee) – rays will cross the axis of *z* in two different points corresponding to two focuses of F_{eo}, F_{ee}. Thus, by means of BL-1 the interesting case of SDM of flat wave will be realized on two spherical waves with divided along an axis by 2 focuses into a size $\Delta F = F_{eo} - F_{ee}$, depending on double-refracting properties of crystal and thickness of *h* of plane-convex lens (Fig. 2, a). This property of BL-1 can be used for a holographing in polarized light in subsequent bunches with the managed intensity.

The calculations given above allowed in theory to predict, and in and experimentally to find out a spatial uninvariance (to irreversibility of passing of hertzian wave in relation to the axis of *z*) at the analysis of distribution of laser bunch through BL-1 in directions (+ Z) (–Z). The invariance of the polarization linear optical systems is unobvious. On the contrary, there is a necessity to examine the location of elements of optical chart in a polarization optics. By the methods of matrix optics easilyto prove, for example, that a result of passing of hertzian wave through a double-base polarizing element (polarization + λ/4) will be different on the state of polarization depending on that, from what part a wave falls on difficult element 2. DKE of type of BL-1 demonstrates an unique case in this sense, when not only the state of polarization but also amount of waves on an exit and picture of interferencepolarized waves are different for opposite directions of distribution of light. At falling of flat wave on BL-1 outside plane-convene lenses ((Fig. 2, a) there is breaking up on four waves, from which waves that (oo) – and (oe) – I are: parallel to axes *z*, and (ee) and (eo) – waves are spherical waves with carrying (along an axis 2) focuses. In case of falling of flat wave on БЛ-1 from the side of plane – convex lens (area of III on a Fig. 2, a) on an exit formed one parallel and one converging astigmatic bunches with the ortogonal states of polarization. Unlike BL-1 DKE of type of BL-2 property of uninvariance does not possess. For BL-2 (Fig. 2, b) forming is characteristic converging (eo) and going (oe) away waves as a result of transformation of e-waves in o- waves and vice versa.

BP is two prisms from a monaxonic crystal as equal-side trapezoids (prisms of Dove), agglutinate with large grounds by the layer of glue, having an intermediate index of refraction of $n_e < n_k < n_o$. Optical axes in making prisms located in a plane perpendicular to the grounds of prisms parallel between then selves and form a angle 45° with the plane of gluing together. the choice of orientation of optical axes is comfortable during work with a laser source;-, to the vertical orientation of vector of *E* of laser radiation, (in parallel to the rib of falling normally on an entrance verge A_1C_1 a laser ray is divided into o- and e-rays. thus o-ray tests a complete internal reflection from the layer of glue. At falling on a verge A_1B_1 of the second laser ray (from an independent source or first ray) formed by an optical division e-ray passes without rejections along an axis *Z* In subsequent o- and e-buckles there is interference on the exit of BP.

At the turn of BP on a small angle and about axis parallel to the rib of BP, o- and e-burkes on the exit of BP have relative movement 3. The condition of existence of interference (photomixing) is переналожение (cross-correlation) o- and e-burcles at bringing their vibrations over to one plane by means of analyzer.

$$\alpha \le \frac{rc\,\mathrm{tg}\,\theta}{\left\{\left[e + 2\alpha\cos\theta\left(\frac{1}{n_e} - \frac{1}{n_0}\right)\right]^2 + \alpha^2\sin^2\theta\cos^2\theta\frac{1}{n_e^2}\left(1-\frac{n_e^2}{n_0^2}\right)^2\right\}^{1/2}}. \qquad (8)$$

Thus top limit of measureable angles of turn where r-radius of the mixed up bunches; 2a, e, 0 are parameters of BP: length of the general founding, length of lateral side, corner at founding. For making from the Icelandic spar of BP with and = 12 mm, $e = 11$ mm, $\theta = 65°$ from (8) we get $\alpha \leq 3°$ at the r of 3 mm.

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