05.2-04 POLARIZATION DEPENDENCE OF THREE-PHOTON ABSORPTION IN SOLIDS. By A.R. Hassan, Physics Department, Faculty of Science, King Abdul Aziz University, Jeddah, Saudi Arabia.

The polarization dependence of three-photon absorption in solids is developed using the Wigner-Eckart theorem for finite symmetry groups. The expression for the absorption coefficient is separated into two parts: i) The geometrical part, which depends on the polarization vectors of the three photons, ii) The dynamical part, which contains the product of three electron-photon matrix elements. New information can be gained by studying these two parts. An application to TlCl crystal is given and an experimental method is suggested.

05.2-05 EFFECT OF A DISLOCATION ON THE PROCESS OF DOMAIN WALL DISPLACEMENT IN A FERROMAGNET. By L.M.Dedukh, M.V.Indenbom, V.I.Nikitenko and V.K.Vlasko-Vlasov, Institute of Solid State Physics of the Academy of Sciences of the USSR, Chernogolovka, USSR.

The motion of a domain wall in a ferromagnet is influenced strongly by crystal imperfections. Study of the role of crystal defects in the formation of the regularities of domain wall motion is therefore necessary for creation of a systematic theory of the magnetization of real ferromagnets. Among elementary crystal defects affecting domain wall displacement, dislocations are the most important ones whose long-range inhomogeneous field of microstresses produces complicated potential relief for domain wall motion. We wish to report the investigation of the potential relief due to individual dislocations for the domain wall motion in transparent ferrimagnetic single crystals of different types. The domain structure and the dislocations were investigated in plane-polarized light on the basis of the magneto-optical and piezo-optical effects.
The strong dependence of the character of the domain wall-dislocation interaction on the orientation of the dislocation axis (l) with respect to the magnetization vectors (M) in adjacent domains is shown. In particular, it was found that in a multiaxial yttrium-iron garnet the distortion of the shape of the wall during its displacement past a dislocation is practically unobserved when the dislocation is perpendicular to the magnetization in domains. In this case the value of the dislocation-induced barrier for the wall motion is determined by the total force of the interaction of the dislocation stress field with the magnetization in the wall and in the domains. This force can be estimated in the first approximation on the basis of the known Peach-Koehler formula. In gadolinium-iron garnet at temperature close to the compensation point, under conditions of small M values, the peculiarities of the domain wall behaviour near a dislocation have been studied.
It is established that, when the dislocation axis is parallel to the M in domains, the wall is strongly bent around the dislocation according to the acting forces that depend essentially on the mutual placement of the dislocation glide plane and the domain wall. In the case of $l \parallel M$, both the character of the distribution of the forces exerted by the dislocation on individual elements of the domain wall and the wall shape near a dislocation in uniaxial ferrimagnet are investigated experimentally and theoretically.
The influence of external magnetic field on the force of the domain wall-dislocation interaction in uniaxial ferrimagnet has been found. It is shown that the deviation of the direction of applied magnetic field from an easy magnetization axis leads to the significant increase of the coercive force for the 180° domain wall displacement due to the appearance of the magnetostrictive nonequivalence in the adjacent domains. Under these conditions, the behaviour of the wall near an edge, a screw, and a mixed dislocation is studied. Possible reasons for some discrepancies between experimental data and theoretical predictions revealed are discussed.

05.2-06 STUDY OF MECHANISMS LIMITING DOMAIN WALL VELOCITY IN REAL FERRIMAGNETIC CRYSTALS. By V.I.Nikitenko, L.M.Dedukh, V.S.Gornakov, Yu.P.Kabanov and A.A.Polyanskii, Institute of Solid State Physics of the Academy of Sciences of the USSR, Chernogolovka, USSR.

The study of dynamical properties of ferromagnetic domain walls is at present a field of research in which rapid progress is being made, a development stimulated mainly by the potential applicability of bubble domains. As a result of these investigations, discrepancies between experimental and theoretical data have been revealed which can not be explained without taking the real crystal and magnetic structure of a ferromagnet into account. In the present work we report results of an experimental investigation of dynamics of domain walls and Bloch lines in yttrium iron garnet single crystals in connection with the real crystal structure.
The magneto-optical measurements of the mobility and mass of a domain wall have been made on the samples cut in the form of a long tetrahedral prism or a polygonal frame which had a single movable 180° domain wall displacing under the influence of the pulsed magnetic field. It is shown that a domain wall in the yttrium iron garnet is characterized by the effective mass greatly exceeding that computed according to Döring and that the domain wall becomes still more "heavy" with increase of external magnetic field.
For the first time, the effect of Bloch lines arising in a domain wall under the action of the magnetic charges localized in the regions of the intersection of the domain wall with