

# NEW NON-REORIENTATIONAL, NON-THERMAL OPTICAL NONLINEAR EFFECT IN MBBA

P. Menéndez-Valdés, J.A. Martín-Pereda

E.T.S.I. Telecomunicación  
Universidad Politécnica de Madrid  
28040 Madrid- SPAIN

It is widely known the anular-shaped beam divergence produced by the optical reorientation induced in nematics by a Gaussian beam. Recent works 1,2 have found a new effect in colored liquid crystal (MBBA, Phase V,...) showing a similar spatial distribution. A new set of random-oscillating rings appears for light intensities over a certain threshold. The beam divergence due to that effect is greater than the molecular reorientation induced one.

In this paper we will describe a static behavior wich seems to be the origin of the one recently reported. By using very thin -20 to 50 um thick - homeotropic samples, we expected to increase the molecular reorientation optical threshold. We have, in this way, found a new, absorption-due, effect when the reorientation is very low, and so, it can be studied separately. A set of perfectly circular, static rings is the diffraction pattern, even at relatively low beam intensities. The spatial intensity distribution, divergence, shape, and motionless aspect of the pattern is completely different to those obtained in PCB in which, as it is not a colored substance, only molecular reorientation is present.

The non-reorientative origin of this effect is fundamented in two reasons. First, the tipical conosopic figure of uniaxial media can be observed between crossed polarizers, showing that the optical axis has not been distorted. Second, a new low-intensity beam wich impinges on the cell superposed to the high-intensity one becomes distorted and focused by the liquid crystal, even when both beam polarizations are normal to each other. The non-thermal origin is proved by the absence of any vibration or motion, and the short time needed to modulate the second, low-intensity laser.

## REFERENCES

- 1.- J.M. Otón, R. Beltrán and J.A. Martín-Pereda, Mol.Cryst.Liq.Crist., 127, 43 (1985).
- 2.- J.M. Otón, M.A. Muriel and J.A. Martín-Pereda, XX Reunión Bienal Real Soc. Esp. Fis., 466 ( 1985).