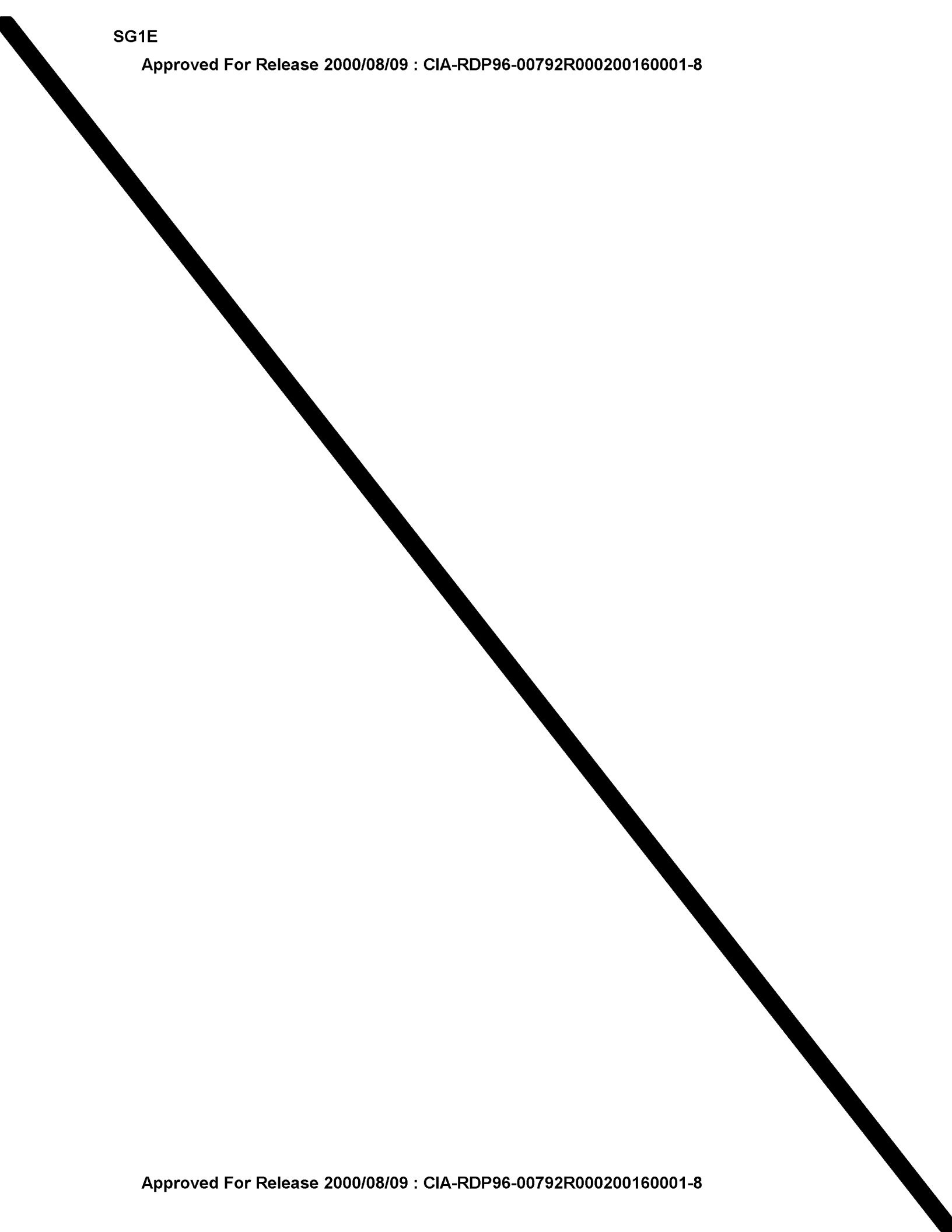

PHYSICAL EFFECTS OF QI ON LIQUID CRYSTAL

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Abstract

The effects of Qi from 14 Qi-Gong amateurs on the double refraction of liquid crystal were observed, 7 of them exhibited positive effects.

Two types of rotations of liquid crystal molecules were introduced to explain the experimental results.

The purpose of our investigation is to study the effect of Qi on the molecular motions of matter. As all living beings are composed of molecules, study the effects of Qi on molecules will help us to get a better understanding of the biological effects of Qi, viz., the growing effect or killing effect on bacteria.

Liquid crystal (LC), because it is highly sensitive to the physical environement, was used in the experiment. The ordered alignment of LC molecules is easily disturbed by the variation of its physical environement. Change in the orientation of alignment means change in its physical properties.

If Qi has any effect on the molecular motions of matter, it will be observed on LC easily.

1. Experimental Setup

A wedge shaped diphenyl nematic liquid crystal was used in our experiment. The top width of the wedge is 10 μ , the bottom width is 300 μ and the height is 1.3 cm respectively. The wedge is confined between two glass plates so that the long axes of the liquid crystal molecules are parallel to the surfaces of glass plates. (fig.1)

A He-Ne laser of power 2 mW was placed 40 cm away from the wedge. Diameter of the laser beam spot on the wedge is 1 mm.

Since liquid crystal is double refractive, an incident light beam on LC will be decomposed into two beams in the crystal. The ordinary beam (O beam, index of refraction n_o) has its plane of polarization perpendicular to the optical axis of LC, i.e. perpendicular to the long axis of LC molecules, and the extraordinary beam (E beam, index of refraction n_e) has its plane of po-

larization perpendicular to that of O beam. (fig.2)

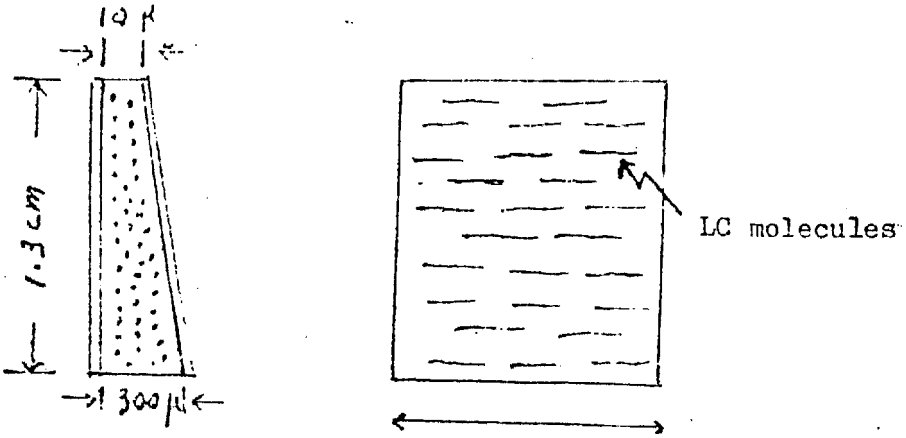

Fig. 1

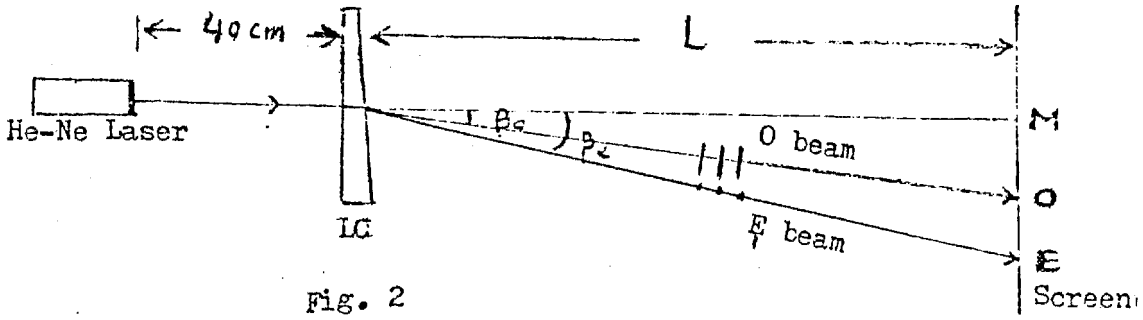

Fig. 2

In fig.2, β_o, β_e are the angles of deflection of O beam and E beam respectively. L is the distance between the laser and the LC. MO and ME are the distances of deflection of two beams from the horizontal line on the screen.

In our case, n_o=1.500, n_e=1.700, then β_o =2°.505 and β_e =3°.320. L=780 cm, MO=31.6 cm and ME=34.1 cm. The separation between the centers of the two beam spots is 2.5 cm.

2. Experiments

The first experiment was done at the end of 1983. The subject put his hand 10-15 cm away rom the liquid crystal, send his Qi from his hand to liquid crystal and the effect of Qi on liquid crystal double refrac-

tion power was observed. Among four Qi-Gong amateurs tested, two of them showed quite strong effects. The intensity of the E beam became weaker and weaker while the intensity of O beam became stronger and stronger. The most striking effect was given by subject G, the intensity of E beam became so dim that only the central part of the beam spot remained visible and the intensity of O beam strongly intensified. The intensities of the beams revovered in one or two minutes after the subject ceased to send his Qi on LC. (fig.3)

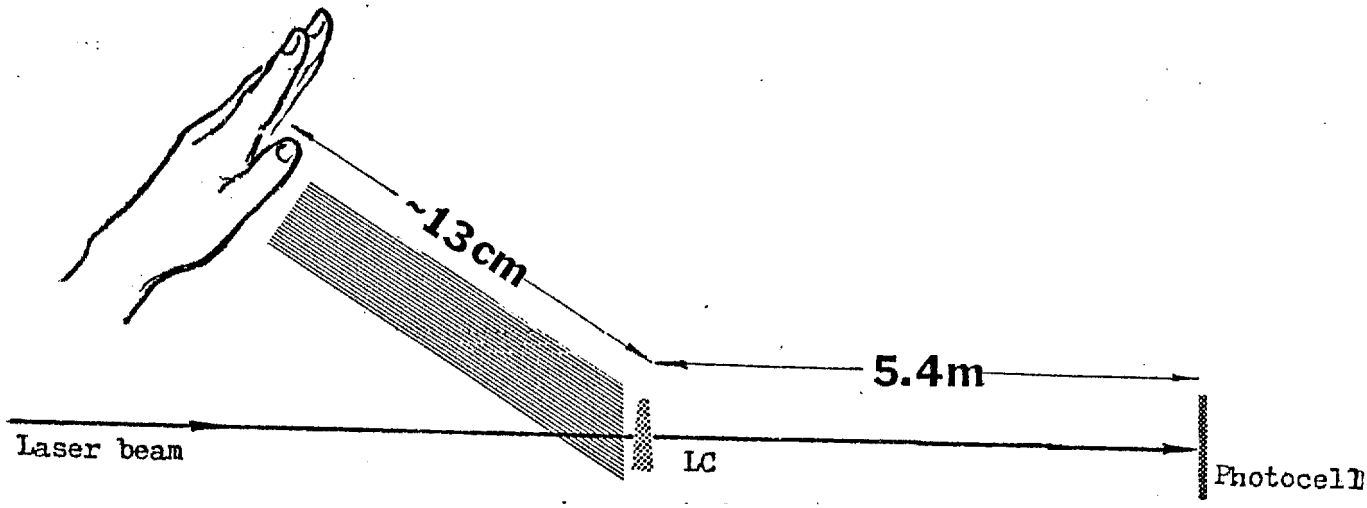

Fig. 3

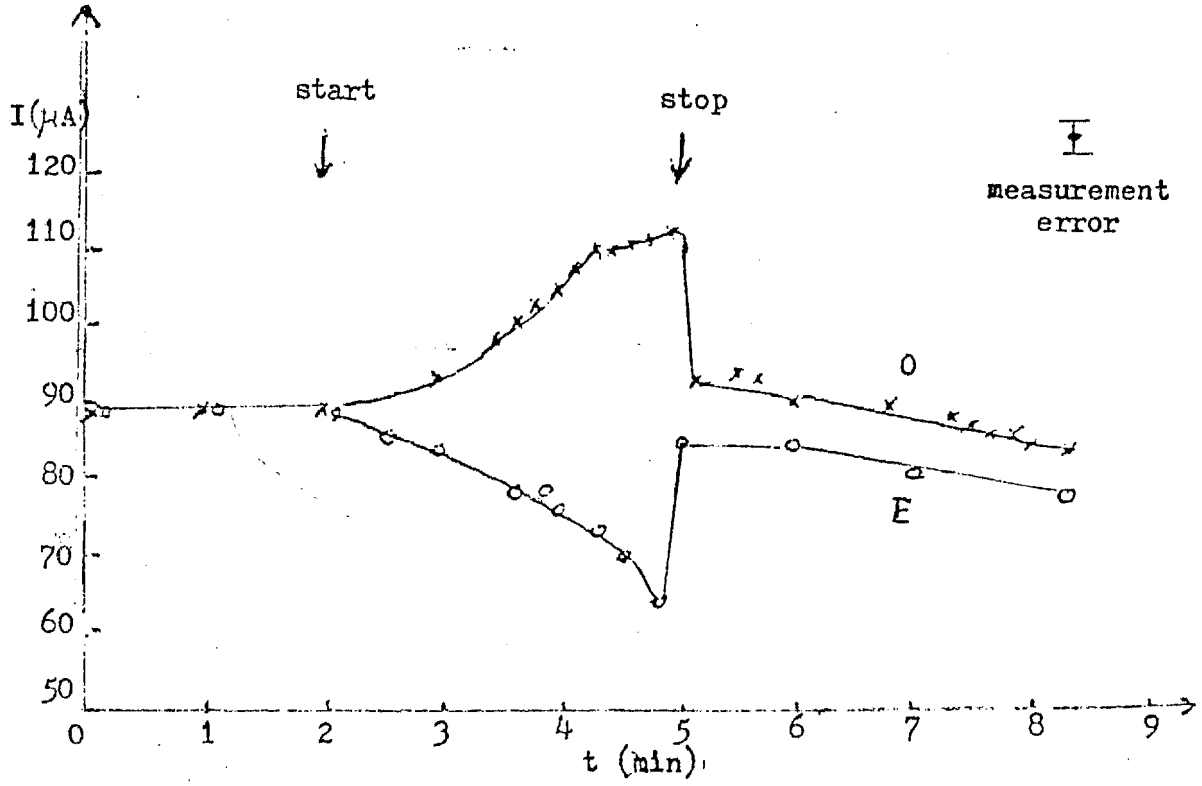

Fig. 4

The effects of two persons who do not exercise Qi-Gong were observed as control. No effect on LC was observed.

In the next experiment two silicon photocells and two microammeters were used to record the changes in spot intensities. A typical result is shown in fig.4. Under the influence of Qi of Amateur T, the intensity of E beam diminished to 75 % of its original value and the intensity of O beam increased to 124 %.

3. Discussion

When a plane polarized beam incident upon a liquid crystal making an angle θ with the optical axis of the LC, the beam will decompose into two components. One component has its plane of polarization parallel to the optical axis of LC and the other component has its plane of polarization perpendicular to it. Let the intensity of the beam be I (Amplitue A, $A=I^{\frac{1}{2}}$), the intensities of the parallel beam and perpendicular beam be $I_{//}$ and $I_{\perp}$ respectively. The amplitude of $I_{//}$ is $A_{//}$ and the amplitude of $I_{\perp}$ is $A_{\perp}$. Then from fig.4a

$$A_{//} = A\cos\theta, \quad A_{\perp} = A\sin\theta.$$

It can easily be shown that

$$I_e = I_{//}, \qquad I_o = I_{\perp}.$$

If the optical axis of LC rotates through and angle $\Delta\theta$ under some external influences, then the parallel and perpendicular components will become : (fig.4) $A\cos(\theta+\Delta\theta)$ and $A\sin(\theta+\Delta\theta)$. The intensities I_e and I_o become

$$I_e - 2(\sin\theta)(\cos\theta)I\,\Delta\theta = I_e - \Delta I_e,$$
$$I_o + 2(\sin\theta)(\cos\theta)I\,\Delta\theta = I_o + \Delta I_o.$$

The increment I_o equals to the decrement I_e, and $\Delta I_e/I_e = 2\tan\theta\,\Delta\theta$.

In our case, $\theta=45^\circ$, $\Delta I_e/I_e = 25\%$, then $\Delta\theta \sim 7^\circ$. That means, under the influence of Qi from Amateur T, the optical axis of LC rotates through an angle about 7°, hence the molecules of LC rotates about 7°.

4. Additional experiments

The molecules of nematic liquid crystal can rotate in an other way -- rotate about their z-axis (fig.6). According to the law of double refraction, n_e decreses but n_o remains invariant. As a consequence, the deflection angle of E beam decreses, and the E beam moves upward. Part of the beam moves out of the reception area of the photocell, the intensity of E beam recorded by the photocell decreses.

Fig. 7 gives a typical result of experiments. The decrement of I_e was 13%, we can calculate that the angle of rotation is approximately 9°.

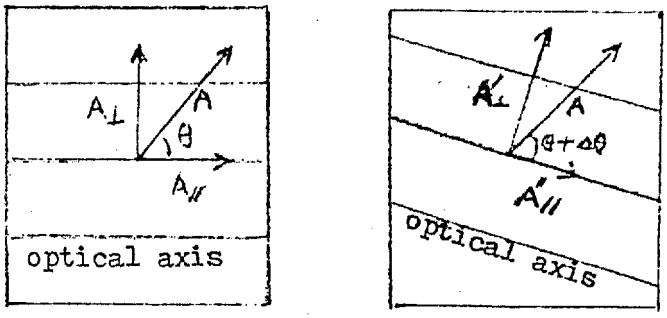

Fig. 5

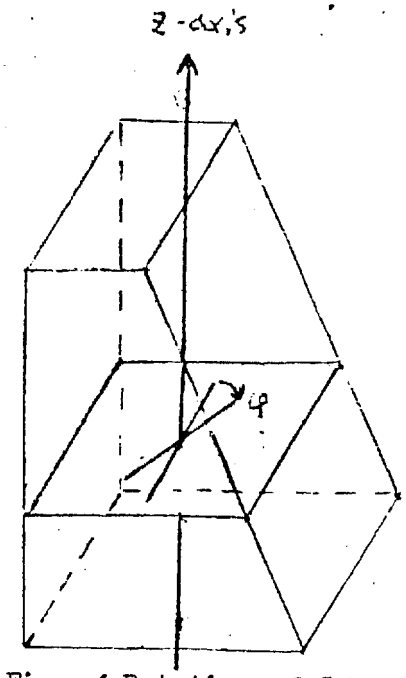

Fig. 6 Rotation of LC molecule

5. Conclusion

The effects on LC double refraction power induced by the Qi from 14 Qi-Gong amateurs were observed, 7 of them showed distinct effects. As control, the effects on LC by 4 non-exercisers were examined, none of them gave any perceivable effects.

The variations of the intensities of O beam and E beam can be explained by the molecular rotations induced by Qi, though the rotation angles are not very large.

Many doctors believe that Qi-Gong therapy is merely a sort of psycho-therapy, the so called Qi itself has no therpeutic effect. Our experiment shows that Qi has real physical effects on non-living molecules. It strongly supports the viewpoint that Qi-Gong therapy is not merely a psychotherapy.

This work has presented at the affiliated hospital of Harvard Medical College and at the Long Island Jewish Medical Center, N.Y. in september 1985 when the Chinese Qi-Gong Science Delagation visiting U.S..

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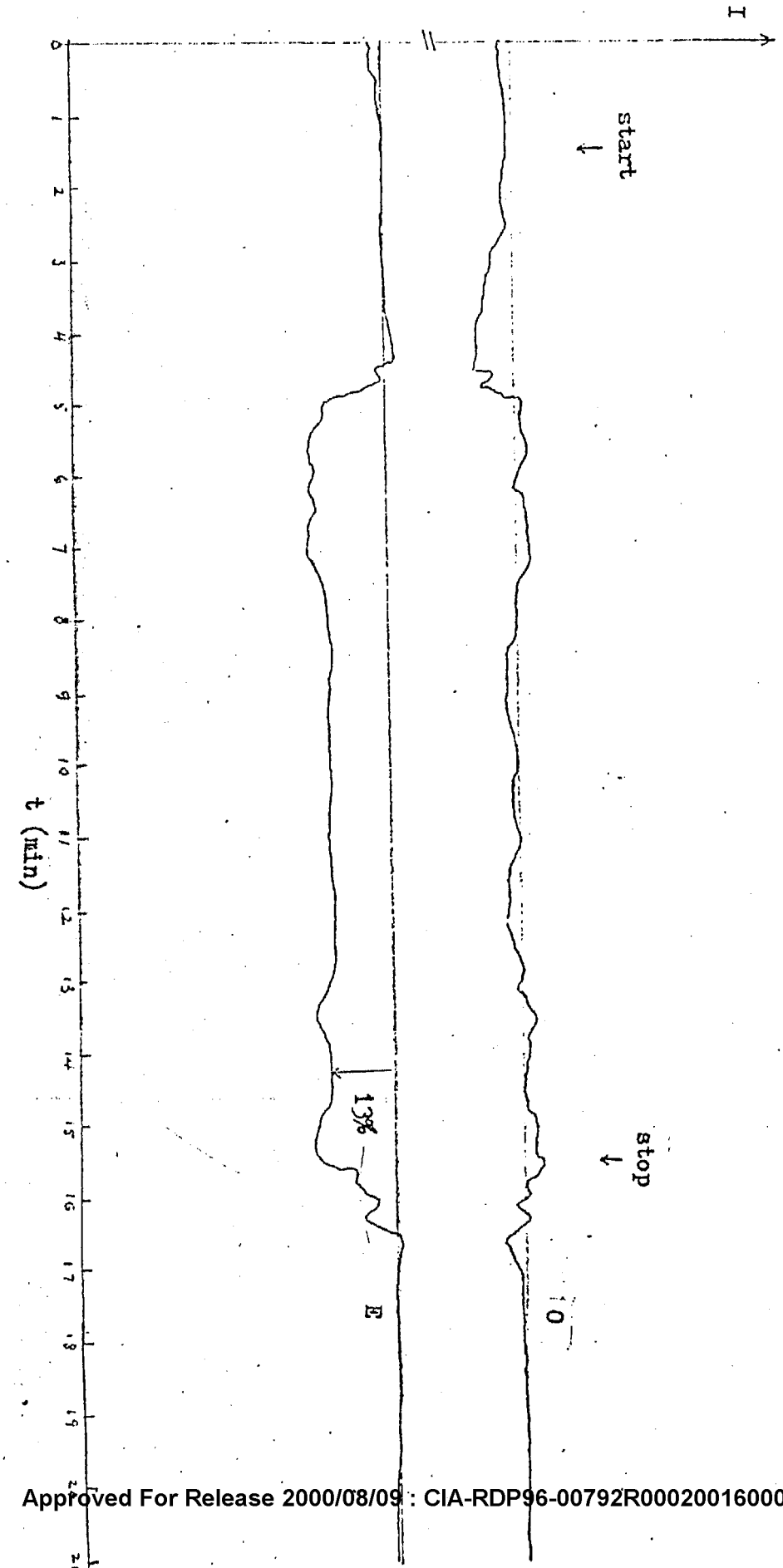

Fig. 7