$$C^h_{ijk;h} = 0 \Rightarrow \rho_{,i} = \rho_{,k} u^k u_i \Rightarrow \Omega = 0. \quad (18)$$

Since $u^4 \neq 0$, (12) implies that $\rho_{,4} \neq 0$ provided $\rho \neq$ constant. We note that Vaidya[1] has shown that if $\rho \neq$ constant then $p = p(\rho, d\rho/ds)$. Hence there is no static perfect fluid distribution with $\rho \neq$ constant for which $C^h_{ijk;h} = 0$. Lastly, since $C^h_{ijk} = 0 \Rightarrow 0 = C^h_{ijk;h} = 0$, all the above results are valid for conformally flat space times representing perfect fluid distributions.

The author is thankful to Professor P. C. Vaidya for valuable suggestions.

31 March 1986

1. Vaidya, P. C., *Phys. Rev.*, 1968, **174**, 1615.

SLEEP MODE FOR TRANSISTOR RECEIVERS

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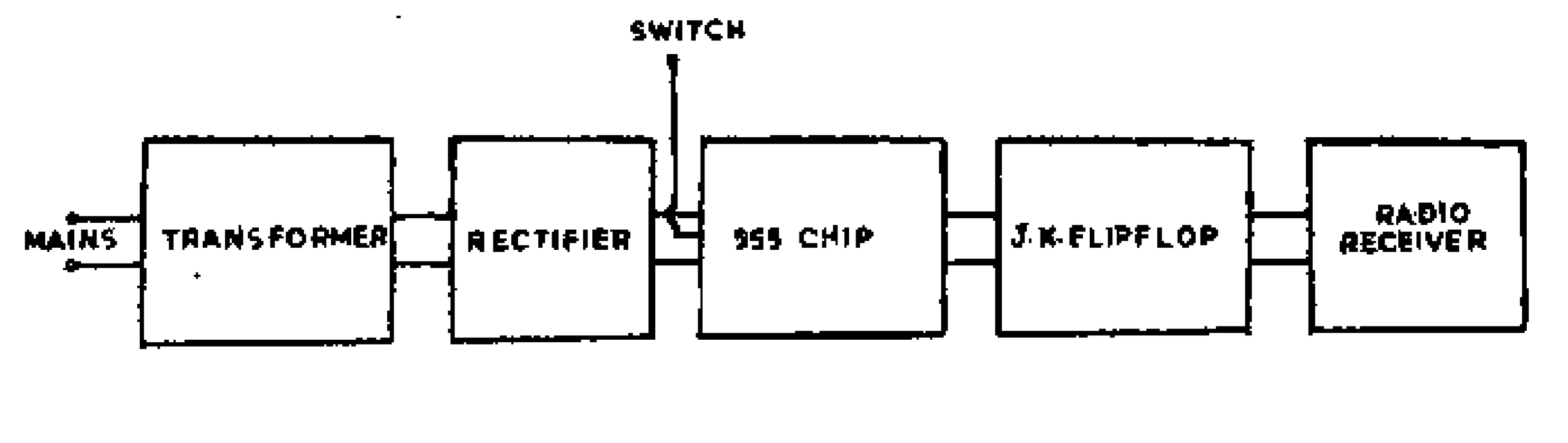
SLEEP mode is usually provided in two-in-ones. When the tape reaches one end the instrument switches off the receiver. The present gadget can switch off the receiver after a specified time. This can be incorporated into the existing radio receiver. See the diagram of the circuitary.

Usually a transformer and a rectifier are used as a battery eliminator. Addition of two chips—555 and J–K flipflop—would make the device a sleep mode gadget. The 555 chip provides the necessary delay time after which the receiver is switched off automatically. J–K flipflop reduces the load on 555 chip — once the switch is pressed down, 555 chip sends a pulse after a specified time, say 10 or 15 min. The J–K flipflop changes the state from high to low. This switches off the receiver automatically.



CIRCUIT DIAGRAM

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OCCULTATION OF SAO 185428 BY 336 LACADIERA

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THE predicted occultation of SAO 185428 by the asteroid 336 Lacadiera (Occultation Newsletter Vol. III, No. 14, p. 304, 1985) was recorded with the 50 cm telescope at the High Altitude Site Survey Observatory of the Department of Science and Technology in Leh (Long: 77° 34′ East, Lat: + 34° 09′) on 12 May 1986. However, the event occurred about 24 min prior to the predicted time.

The output from the unrefrigerated 1P21 photomultiplier was fed to a chart recorder after amplification through a DC amplifier. Figure 1 shows the portion of the record during the event.

The immersion occurred at $19^h\ 15^m\ 32^s$ and emersion at $19^h\ 15^m\ 57^s$ UT. Thus the duration of the event was 25 sec which turned out to be larger by 9 sec than the predicted duration. This longer duration suggests an elongated shape for the asteroid since the prediction was made assuming that the asteroid was spherical. Further the event appears to be a case of grazing occultation, because the observed drop in light level is about 0.9 mag, whereas a total occultation would have given a drop of ~4 mag. A continuous visual monitoring during the event through the 15 cm guide telescope showed flickering of the star light which could be a result of several disappearances and reappearances of the star behind the irregular limb of the asteroid.

A single observation like this can only set a lower limit to the size of the minor planet which may be obtained from a knowledge of the relative velocity of the object and the duration of the occultation event. Simultaneous observations from several sites within 10–50 km from the centre of the track will lead to a better estimate of the size and shape of the asteroid. However, on the basis of the present observation, it may still be inferred that the asteroid

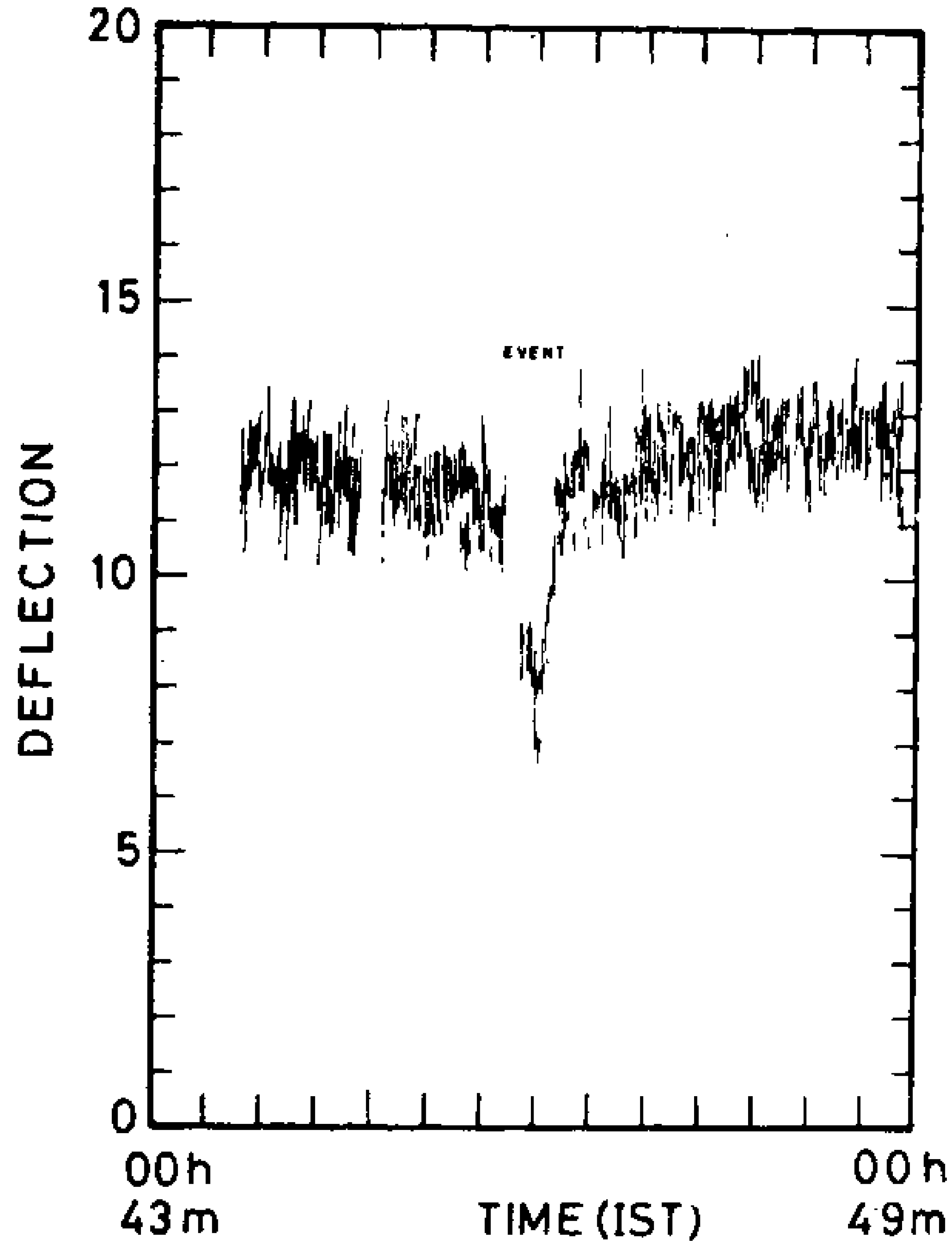

Figure 1. A reproduction of the original tracing of the occultation event as recorded on the DC chart recorder.

is elongated and the lower limit on its size along the direction of the track is 119 ± 5 km. Finally, the difference in the observed and predieted times can be used to improve the orbital elements of the asteroid.

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PRESSURE EFFECT ON THE DIELECTRIC PROPERTIES OF $LiCsSO_4$

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$LiCsSO_4$ belongs to the family of crystals with the general formula $M'M''BX_4$ (M': Li, Na etc. M'': K, Rb, Cs, NH_4 etc. BX_4: SO_4, SeO_4, BeF_4). It undergoes a ferroelastic phase transition at 202° K from the room temperature orthorhombic Pcmn phase to a low temperature $P2_1/n$ phase[1]. Aleksandrov *et al*[2] and Delfino *et al*[3] have studied the thermal and dielectric properties of $LiCsSO_4$ (LCS) and it has been suggested that it undergoes a continuous phase transition. While reporting the structural and physical properties of LCS Aleksandrov *et al*[2] mentioned that the pressure dependence of dielectric constant as a function of temperature shows a negative shift of T_c with $dT_c/dP = -2.6°$ K/Kbar. However, this value differs much from the theoretically expected value of dT_c/dP based on Ehernfest relation. Further, details of their pressure study have not been given. In view of this, a detailed study of the effect of hydrostatic pressure on the dielectric properties of LCS was taken up and the results obtained therein are reported here.

For the purpose of measuring the dielectric constant at high pressures a piston-cylinder type pressure cell was used. The capacitance of the sample was measured using a Marconi Universal Bridge TF 1313A operating at 1 kHz. The measurement was carried out along the *b*-axis of the crystal. A bath-type cryostat was used to cool the pressure cell. The details of the instrumentation, calibration and the measurement were published earlier[4,5].

The observed dielectric anomalies along the *b*-axis of LCS crystal in the heating run under various hydrostatic pressures are shown in figure 1. It is seen from these plots that the phase transition tempera-

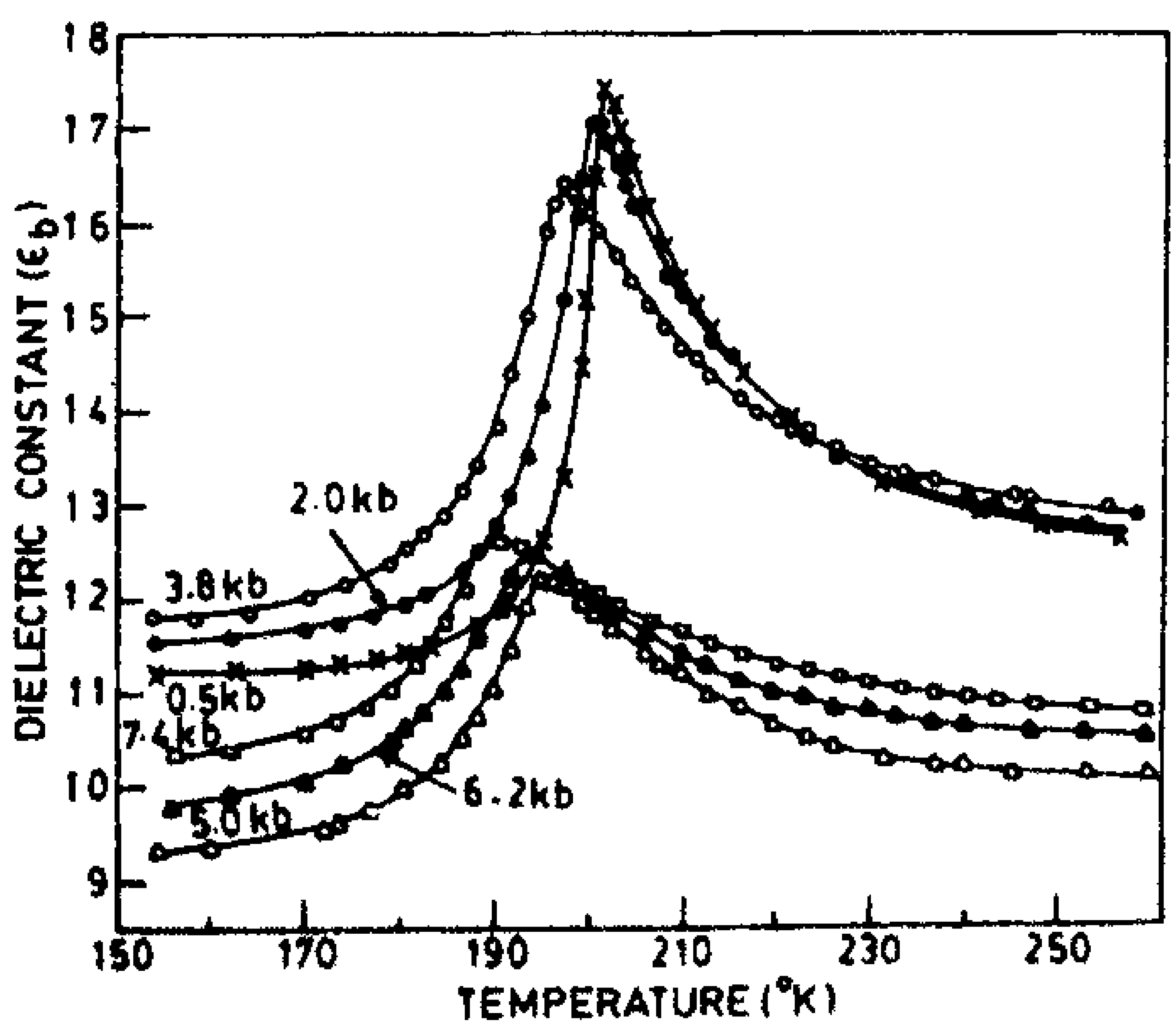

Figure 1. Plots of ϵ_b vs T under various hydrostatic pressures.