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Microwave Properties of a Select Liquid Crystal JAMES ROBERTS, AMAN ANAND, University of North Texas, Denton, TX, JAI N. DAHIYA, Southeast Missouri State University, Cape Girardeau, MO, UNT-SEMO COLLABORATION[1] — A resonant cavity in the TE_{011}mode is used to study the microwave dielectric response of liquid crystal p-azoxyanisole at microwave frequencies. The dielectric behavior of this liquid crystal is studied at 8.0 GHz to 10.2 GHz. The complex dielectric constant of liquid crystals are calculated by using Slater's Perturbation Equations and the relaxation time is calculated using Debye's Equation for polar molecules. The microwave resonant cavity is interfaced to a computer and the dielectric relaxation data is taken using this computer interface. The frequency shift and the Q-changes of the microwave resonant signal are determined experimentally by controlling the position of the markers through a computer. By placing the markers on the microwave signal of the resonant cavity manually is very time consuming and at the same time introduces lots of error in the experimental data. With the use of the computer interfaced resonant cavity this error is reduced dramatically and a large set of data points are taken in a much shorter time. The computer performed the calculations of the complex dielectric constant of the material under study and at the same time plots graphs of frequency shifts and Q-changes as a function of applied frequency for this experiment related to the microwave dielectric response of liquid crystal p-azoxyanisole.

[1]This was a joint project between the two universities where the crystal sample was prepared at Southeast and Studied at UNT

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