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Investigation of Dielectric Properties of Liquid Crystals near Phase Transitions MICHAEL KORDELL, TRACY LAWSON, CHANDRA PRAYAGA, LASZLO UJJ, UWF PHYSICS DEPARTMENT TEAM — Precise capacitance measurement has been performed near the phase transitions of scientifically important liquid crystals such as 8-CB. The details of the measurements to get high precision data on dielectric constant and its temperature dependence will be presented. The results show significant changes of the dielectric properties of the liquid crystal near the smectic-to-nematic and nematic-to-liquid phase transitions attributed to structural changes of the relevant phases. In order to measure the details of the functional dependence near the phase transition, the temperature was varied with milliKelvin precision. The data was obtained using a self-assembled RC circuit with phase sensitive lock-in amplifier detection. Calibration of the device was made by measuring known standard capacitances. In order to get high accuracy the measurement was completely computer controlled. The Method applied here will contribute to the better understanding of thermodynamic behavior of liquid crystals and can be routinely used to characterize novel materials showing phase transitions.

Tracy Lawson

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