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Analysis of an Unusual Liquid Crystal Phase Transition LONI FULLER, JOSH FANKHAUSER, California Polytechnic State University, SLO student, JONATHAN FERNSLER, California Polytechnic State University, SLO professor — Liquid crystals are a unique phase of matter that resemble a state between a solid and liquid. Within these properties, liquid crystal molecules have the ability to align and create layers. From this phenomenon, many electro-optical effects can be investigated, such as measuring the tilt angle between molecules at different temperatures and applied electric fields and also measuring the birefringence, which is a unique property of liquid crystals in which the index of refraction of the sample behaves differently along different axes. In order to better understand these electro-optical effects, we designed a more precise protocol of measuring this data. This procedure includes manipulating polarizing filters and measuring the effective light intensities with a camera attached to the microscope. From this, we can more successfully analyze the electroclinic effects of liquid crystal displays. For instance, we analyzed the phase transition of two unusual "de Vries" smectic liquid crystals. The phase transition for both materials was consistent with mean field theory near a tricritical phase transition.

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