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Field Control of the Surface Electroclinic Effect in Liquid Crystal Displays II[1] KARA ZAPPITELLI, DANA HIPOLITE, KARL SAUNDERS, Cal Poly- San Luis Obispo — As previously introduced in the presentation by Dana Hipolite, chiral, smectic liquid crystal molecules aligned in layers can be controlled by the application of an electric field, which has a variety of implications for the quality of LCD displays. Both the bulk electroclinic effect (BECE) and surface electroclinic effect (SECE) impact the angle at which the molecules tilt with respect to the director in different areas of the cell. Certain LC's exhibit a continuous Sm-A* to Sm-C* transition, where the angle of the surface and bulk molecules change continually with the electric field. Other LC's exhibit first order transitions where we see jumps in the tilt at different values of the applied electric field for the bulk and surface molecules respectively. The difference in angle of the bulk and surface molecules in both of these situations causes discrepancies in the layer spacing within the LC cell. These discrepancies lead to frustrations within the cell, which can be quantified by the strain (?). These frustrations can be relieved in multiple ways, however the method of relief may lead to negative impacts on the alignment quality of the display itself.

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