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Absence of uniform nematic phase for thin 8CB films ERGYS SUBASHI, RAFAEL GARCIA, Worcester Polytechnic Institute — Certain thermotropic liquid crystal films exhibit a strange phenomenon in which two different thicknesses coexist side-by-side on solid surfaces. For 5CB these two film thicknesses appear to correspond to two different phases: nematic and isotropic. The coexistence persists for a temperature range which depends on the initial thickness of the film. A similar phenomenon is present in films that have a smecticA phase such as 8CB. For these films just below the nematic to isotropic transition temperature, we observe a coexistence region very similar to that observed previously for 5CB. We also report new experiments which show that for 8CB films on silicon, near the smecticA to nematic transition temperature, there is a coexistence region that is strikingly different from the one observed near the nematic to isotropic transition. Furthermore, there is a new phenomenon for 8CB films thinner than a certain critical thickness d*: as the temperature increases or decreases the film goes from smecticA to isotropic and back with no intermediate uniform nematic phase.

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