1086-VG-2455 **Eric P. Choate*** (echoate@nps.edu). *Stability of the homeotropic orientation in the optical Fredericks transition of a liquid crystal layer.*

The orientation of a liquid crystal in the absence of an electromagnetic field is determined by hard-wall anchoring conditions. However, the application of an electromagnetic field, such as a light wave, causes the liquid crystal to align with the field if the field is above a critical intensity, a phenomenon known as the Frederiks transition. The wave is commonly assumed to be unaffected by the liquid crystal reorientation, but the reorientation does change the anisotropy of the liquid crystal medium as the wave passes through it, which in turn affects the wave propagation. We examine the nonlinear optics problem of coupling the liquid crystal orientation and the electromagnetic field for a normally incident plane wave passing through a liquid crystal layer between two parallel plates with homeotropic anchoring conditions so that the orientation of the layer is perpendicular to the plates in the absence of the field. Using a combination of analytical and numerical techniques, we minimize the free energy of the liquid crystal system and estimate the critical field strength at which the homeotropic orientation becomes unstable. We also briefly examine the stability of the non-homeotropic solution for stronger fields and the possibility of hysteresis. (Received September 25, 2012)