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Liquid crystal film development for plasma mirrors and waveplates G.E. COCHRAN, P.L. POOLE, C. WILLIS, R.J. HANNA, K. PYTEL, K.S. SULLIVAN, C.D. ANDERECK, D.W. SCHUMACHER, The Ohio State University — Many laser-plasma phenomena currently under study depend critically on the quality of the pulse contrast. Costly sacrificial plasma mirrors are now commonly used to improve the temporal laser contrast before target interaction, especially for ion acceleration where high contrast is necessary to achieve interesting new mechanisms. Liquid crystal films were originally developed as variable thickness thin-film targets, and were demonstrated for this purpose in P. L. Poole *et al.* *PoP* **21**, 063109 (2014). Varying film formation parameters such as volume, temperature, and draw speed allows thickness control between 10 nm and several 10s of microns, in-situ and under vacuum. Development since that initial work has allowed large area films to be formed, several cm^2 in extent, with the same thickness range. The molecular flatness of a freely suspended film renders these films excellent low-cost plasma mirrors, given appropriate formation control. Additionally, the birefringence of the liquid crystal used here permits these films to be used as large area zero-order waveplates at the appropriate thickness. Details on the current state of liquid crystal film application development, including a >1 Hz small area film formation device, will be presented. This work was performed with support from the DARPA PULSE program through a grant from AMRDEC and by the NNSA under contract DE-NA0001976.

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