Abstract Submitted
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A new device for high repetition rate plasma mirrors for petawatt class lasers using liquid crystal films.[1] NICK CZAPLA, ANTHONY ZINGALE, JORDAN PURCELL, SHYON DESHPANDE, DOUGLASS SCHUMACHER, Ohio State University, HIGH ENERGY DENSITY PHYSICS TEAM — The full use of high repetition rate (HRR, >1 Hz) PW class lasers is currently hindered by limitations in target insertion, diagnostics, real time data analysis and more. In particular, HRR plasma mirrors (PMs) are necessary for some experiments either for pulse contrast enhancement or beam redirection. We have previously shown the ability to form quality PMs using films made of the liquid crystal 8CB, including varying thicknesses films (10 nm to >1 μm) for use as targets for ion acceleration (Poole, *et al.*, Applied Physics Letters **109**, 151109 (2016)), plasma mirrors for pulse contrast enhancement (Poole *et al.* Scientific Reports **6**, 32041 (2016)) at ˜1 shot/minute repetition rates, and beam redirection for laser accelerated electrons at the BELLA Center (LBL). Here we describe a new device that can deliver ˜20 nm thick 8CB LC films for use as plasma mirrors at repetition rates of ˜1 Hz with good film flatness and improved pointing stability and robustness at a very low cost per film. We also discuss the use of other liquid crystals, including discotic liquid crystals.

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