Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

Back-reflection mitigation solutions for 10 PW high-power laser experiments PETRU GHENUCHE, MIHAIL OCTAVIAN CERNAIANU, DANIEL URSESCU, Extreme Light Infrastructure Nuclear Physics (ELI-NP), IFIN-HH, ROMANIA, YOSHIAKI HAYASHI, HIDEAKI HABARA, Graduate School of Engineering, Osaka University, Osaka, Japan, FLORIN NEGOITA, BOGDAN DIACONESCU, Extreme Light Infrastructure Nuclear Physics (ELI-NP), IFIN-HH, ROMANIA, DAN STUTMAN, Extreme Light Infrastructure Nuclear Physics (ELI-NP), IFIN-HH, Johns Hopkins University, KAZUO A TANAKA, Extreme Light Infrastructure Nuclear Physics (ELI-NP), IFIN-HH, ROMANIA — Recent measurements with PW class lasers demonstrated that energies of up to 3% of the incident laser energy can be back-reflected in the laser system [1] and that modulations of the target surface can occur due to the radiation pressure [1, 2]. Given the foreseen intensities in the ELI-NP experiments in the range of 1022-1023 W/cm2, back-reflections of the main laser pulse can occur from the distorted plasma, leading to irreversible damages of the beam transport system optics or even to the laser amplification chain. Moreover, the debris generated from the laser – target interaction can damage the focusing optics and decrease their performance from only a few shots. We are presenting simulated results of different configurations for suppressing the back-reflection based on sacrificial mirrors and a single plasma mirror, and their limitations. [1] S. Ter-Avetisyan, et al., Optics Express 24 (24), 28104 (2016) [2] H. Vincenti, et al., Nature Commun. 5, 3403 (2014)

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Date submitted: 21 Jul 2017 Electronic form version 1.4