

**NIF PAM for OMEGA EP:** Beam smoothing with two-dimensional smoothing by spectral dispersion (2-D SSD)<sup>1</sup> is important for successful direct-drive ignition on the National Ignition Facility (NIF). The implementation of 2-D SSD on the NIF will require significant engineering modifications to the existing preamplifier module (PAM) design and it will also require that NIF be operated at a high bandwidth ( $\sim 10.8 \text{ \AA}$ ). It is important to validate NIF laser-system performance and single-beam uniformity with 2-D SSD. The OMEGA EP Laser System architecture closely resembles that of the NIF. This validation will be facilitated by implementing 2-D SSD modifications on a production NIF PAM and using it as an alternate OMEGA EP front end. In May, a production NIF PAM was delivered from LLNL (see Fig. 1) to initiate this project. The installation of the PAM in the OMEGA EP Laser Sources Bay is scheduled to be complete by January 2009 and the initial deployment of 2-D SSD on the PAM is scheduled for the end of FY09. The specified SSD parameters of the OMEGA EP system with the NIF PAM are summarized in Table 1. The design provides a total UV bandwidth of  $\sim 1.0 \text{ THz}$ , comparable to that implemented on OMEGA. Figure 2 shows the layout of the OMEGA EP Laser Sources Bay for Beams 3 and 4. Two identical long-pulse front ends are available for Beams 3 and 4 and space was reserved for the NIF PAM for use as an alternate injection source for Beam 4.

**OMEGA Operations Summary:** The OMEGA laser conducted 131 target shots in May with an overall experimental effectiveness of 96.6%. A total of 72 National Ignition Campaign (NIC) shots were taken by LLE-led teams including 24 for IDI NIC and 48 for DDI NIC. The 59 non-NIC shots included 16 shots for an NLUF experiment that was carried out by a University of Michigan led team; 24 shots for two Laboratory Basic Science experiments, and 19 LLNL-led experiments.

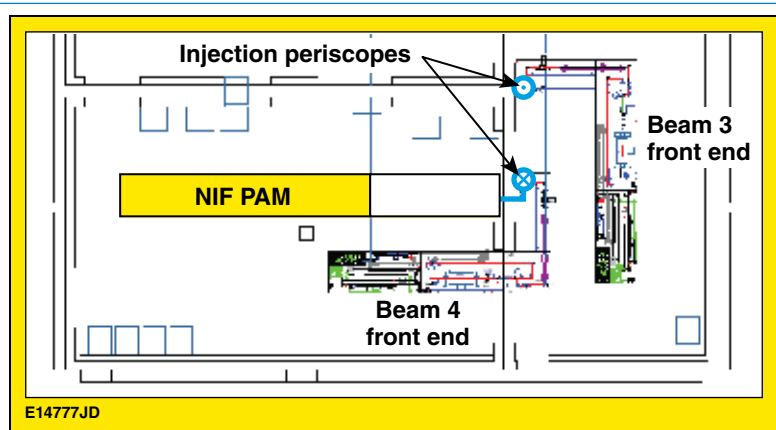


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Figure 1. A NIF PAM was installed in the OMEGA EP Sources Bay and will be used for beam-smoothing studies.

Table I: Proposed 2-D SSD parameters for the NIF.

	Modulator 1	Modulator 2
Modulator type	Integrated optics	Bulk
Frequency (GHz)	15.4	2.8
Bandwidth ( $\text{\AA}$ )	10.8	2.0
Number of color cycles	2	1
Full-width dispersion ( $\mu\text{rad}$ )	100	50
Dispersion direction	Vertical	Horizontal



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Figure 2. The NIF PAM readily couples to Beam 4.

1. S. Skupsky and R. S. Craxton, Phys. Plasmas **6**, 2157 (1999).