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Title: Pre-Shot Report for
NIF #5 Capsule BL Campaign
December 10, 2009

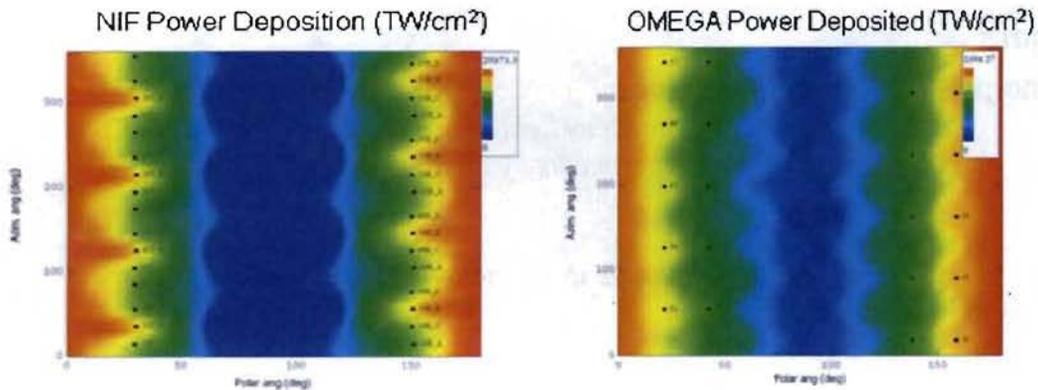
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Intended for: Internal Report



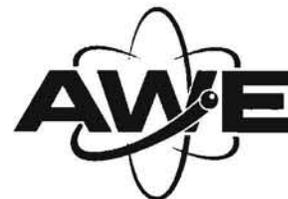
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**Direct Direct Drive Experiments
on the
OMEGA Laser
at the
Laboratory for Laser Energetics
of the
University of Rochester**



The NIF laser power deposition (left) for a capsule backlighter given the geometric constraints of the planned NIF experiments. The polar direct drive configuration on OMEGA (right) provides an adequate representation for the NIF case. This data is critical for determining if the capsule backlighters will be a viable option for the future NIF experiments.

**Pre-Shot Report for
NIF #5 Capsule BL Campaign
December 10, 2009**



Overview

Points of Contact

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Dec., 10, 2009*

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Principal Designer
Dec., 10, 2009*

Goals

Principal Campaign Objectives:

Characterize Kr-fill capsule backlighters using a laser illumination similar to that expected in future NIF experiments by measuring:

- a) X-ray source size*
- b) X-ray spectrum (amplitude as a function of wavelength)*
- c) Duration of spectrum*
- d) Time to peak x-rays*

Bibliography

P-24-U-2009-??? Final Target Request for Dec., 2009 NIF #5 experiments at OMEGA

Proposed Shot List

Sequence #	Target		Sequence #	Target
1	1.0 atm Kr		9	0 atm Kr
2	0.5 atm Kr		10	0.5 atm Kr
3	1.0 atm Kr		11	<i>0.2 atm Kr</i>
4	0.5 atm Kr		12	<i>0.5 atm Kr</i>
5	0.2 atm Kr		13	<i>0.5 atm Kr</i>
6	0.2 atm Kr		14	<i>0.2 atm Kr</i>
7	0 atm Kr			
8	0.2 atm Kr			

Proposed Target Order

Diagnostic List

Port	Diagnostic	Priority	Notes
P3 (TIM 1)	XRFC1	Secondary	6x
H7 (TIM 2)	SSCA	Primary	
H18 (TIM 3)	GXIT	Primary	Nspect
P6 (TIM 4)	XRFC2	Secondary	12x
H14 (TIM 5)	XRFC4	Secondary	6x
P7 (TIM 6)	TTPS	Primary	
H13C	XRPHC	Primary	CID w/ Be Filter
H12C	XRPHC	Primary	CID w/ Be Filter
P2B	Henway	Secondary	
H12F	Dante	Primary	
	HXR		

Target List

HED121009										
campaign	mounting	eggcrate	cavity #	Capsule number	OD(um)	gas	P ₀ atm	wall thick. (um)	τ days	Prim t _{so} Date
HED121009	tripod	IDC LANL NIF5-10A	1	IDC LANL NIF5-10A-42	602	Kr	0.0	8.5	>30	from
HED121009	tripod	IDC LANL NIF5-10A	2	IDC LANL NIF5-10A-43	606	Kr	0.0	8.1	>30	from
HED121009	tripod	IDC LANL NIF5-10A	4	IDC LANL NIF5-10A-47	628	Kr	0.2	8.8	>30	from
HED121009	tripod	IDC LANL NIF5-10A	5	IDC LANL NIF5-10A-49	613	Kr	0.2	8.3	>30	from
HED121009	tripod	IDC LANL NIF5-10A	6	IDC LANL NIF5-10A-50	606	Kr	0.2	8.3	>30	from
HED121009	tripod	IDC LANL NIF5-10A	7	IDC LANL NIF5-10A-51	617	Kr	0.2	8.6	>30	from
HED121009	tripod	IDC LANL NIF5-10A	8	IDC LANL NIF5-10A-53	610	Kr	0.2	8.9	>30	from
HED121009	tripod	IDC LANL NIF5-10A	9	IDC LANL NIF5-10A-57	615	Kr	0.2	8.9	>30	from
HED121009	tripod	IDC LANL NIF5-10A	11	IDC LANL NIF5-10A-45	614	Kr	0.5	8.7	>30	from
HED121009	tripod	IDC LANL NIF5-10A	12	IDC LANL NIF5-10A-63	604	Kr	0.5	8.5	>30	from
HED121009	tripod	IDC LANL NIF5-10A	13	IDC LANL NIF5-10A-64	614	Kr	0.5	9.0	>30	from
HED121009	tripod	IDC LANL NIF5-10A	14	IDC LANL NIF5-10A-67	615	Kr	0.5	8.4	>30	from
HED121009	tripod	IDC LANL NIF5-10A	15	IDC LANL NIF5-10A-69	608	Kr	0.5	8.3	>30	from
HED121009	tripod	IDC LANL NIF5-10A	17	IDC LANL NIF5-10A-72	616	Kr	0.9	9.1	>30	from

HED121009	tripod	IDC LANL NIF5-10A	18	IDC LANL NIF5-10A-73	613	Kr	0.9	8.3	>30	from
HED121009	tripod	IDC LANL NIF5-10A	19	IDC LANL NIF5-10A-74	602	Kr	0.9	9.1	>30	from
HED121009	tripod	IDC LANL NIF5-10A	20	IDC LANL NIF5-10A-75	618	Kr	0.9	8.7	>30	from

Experimental Details

Diagnostic and Target Orientations

This experiment utilizes a single configuration with laser beams from 21 and 42 degrees are used to create a polar direct drive on the capsule (Figure 1). This proves to be a suitable representation when comparing the azimuthal and polar power deposition for the NIF and OMEGA cases (Figure 2).

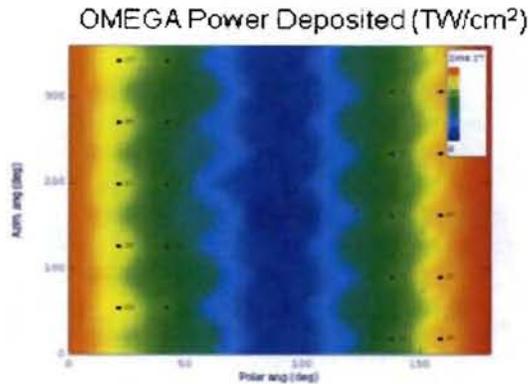


Figure 1 – Laser beam power deposition for the Dec. 2009 capsule backlighter campaign.

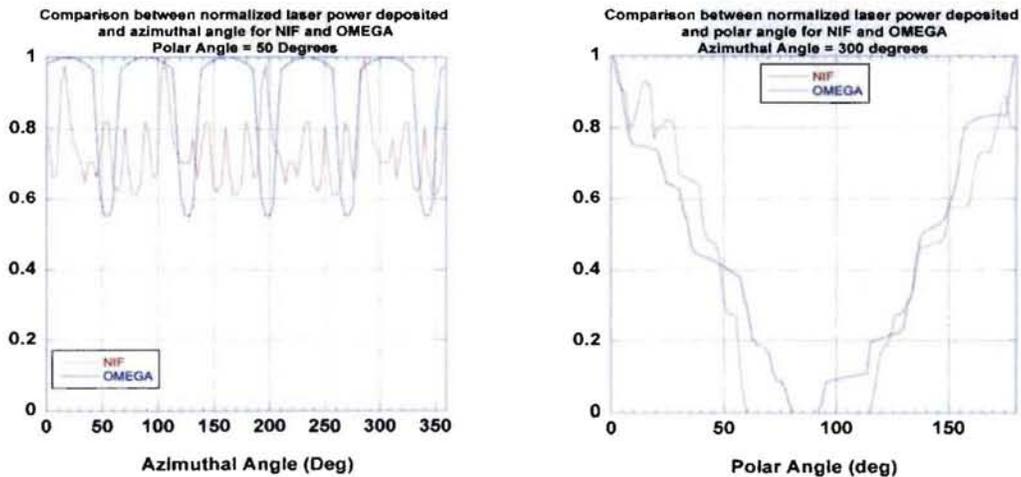


Figure 2 – A comparison of the laser power deposition for the NIF (red) configuration and the OMEGA (blue) configuration for the azimuthal (left) and polar (right) directions.

Pre-Shot Simulations

The simulations for these experiments were performed by John Morton of AWE. Due to issue with mesh tangling, the asymmetric laser drive was not able to be simulated and

so all simulations were performed in 1-D symmetry. The expected flux for the capsules is shown in Figure 3.

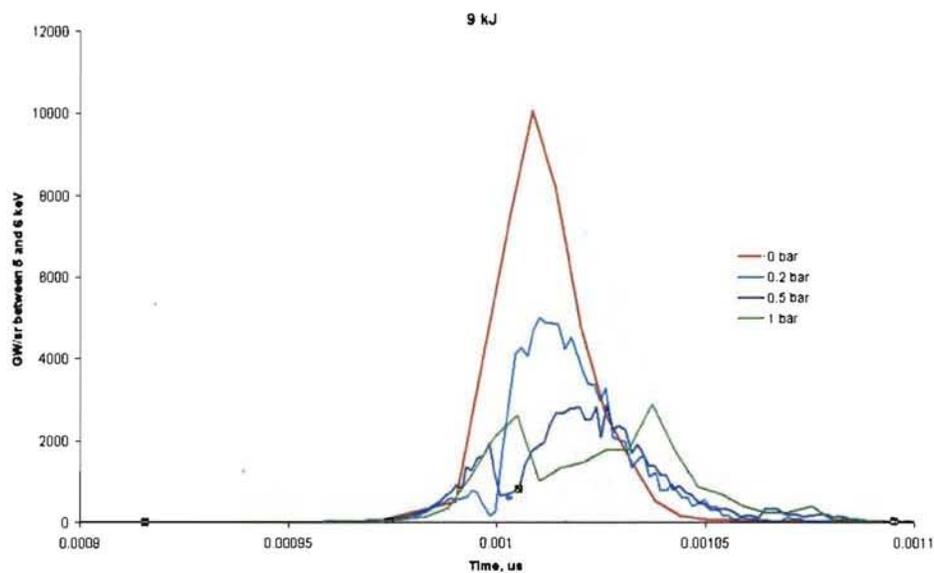


Figure 3 – The x-ray flux between 5 and 6 keV for capsules with gas fills of 0 atm (red), 0.2 atm (cyan), 0.5 atm (blue) and 1 atm (green) of Kr gas.

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