

2013

LABORATORY *for* LASER ENERGETICS

University of Rochester • Laboratory for Laser Energetics

www.lle.rochester.edu



Mission Statement

The Laboratory for Laser Energetics (LLE) of the University of Rochester is a unique national resource for research and education in science and technology. The Rochester area has a history of innovation and provides a unique setting for LLE within a technologically sophisticated community. Established in 1970 as a center for the investigation of the interaction of intense radiation with matter, the Laboratory has a five-fold mission:

1. to conduct implosion experiments and basic physics experiments in support of the National Inertial Confinement Fusion (ICF) Program;
2. to develop new laser and materials technologies;
3. to provide graduate and undergraduate education in electro-optics, high-power lasers, high-energy-density physics, plasma physics, and nuclear fusion technology;
4. to operate the National Laser Users' Facility (NLUF); and
5. to conduct research and development in advanced technology related to high-energy-density phenomena.

The 2013 LLE Calendar contains information about many of the Laboratory's programs. We hope that you enjoy using your copy of the LLE Calendar and wish you a productive and fulfilling 2013.



LABORATORY
for
LASER ENERGETICS
UNIVERSITY of ROCHESTER
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Welcome to 2013



LLE Vision

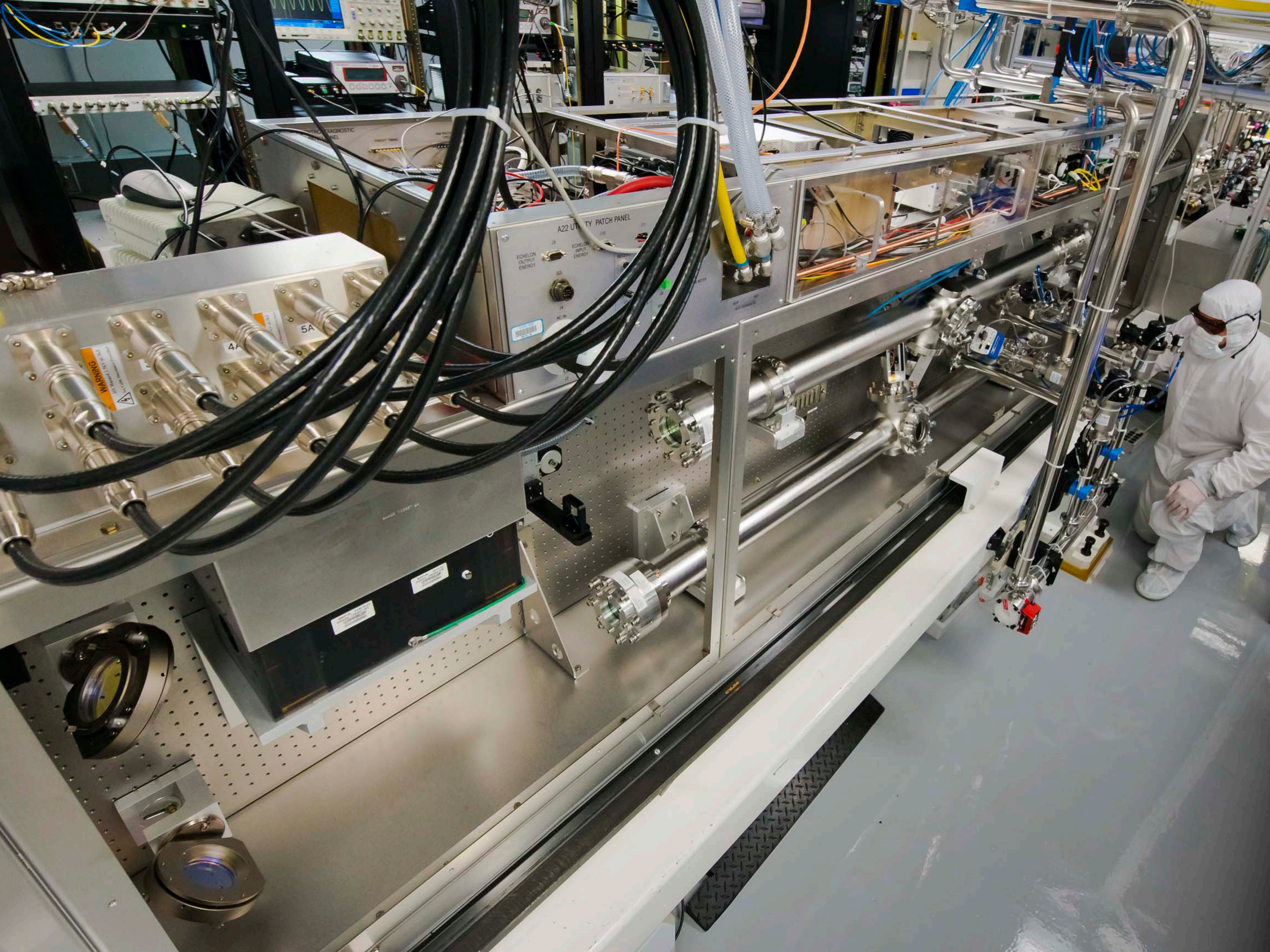
LLE envisions a secure, environmentally neutral, and inexhaustible energy source for mankind. This future energy source—fusion—is the basis of the sun's energy and is carbon and radioactive-waste free.

2013 will be a year of challenges and opportunities

- Ongoing pursuit of ignition and the development of ignition alternatives
- Polar-drive cryogenic implosions on OMEGA!
- Omega will remain the premier high-energy-density user facility
- Education and training of students (high school through Ph.D.) is a high priority



Prof. Robert L. McCrory
Vice President and Vice Provost, University of Rochester
Director, Laboratory for Laser Energetics



A22 UTILITY PATCH PANEL

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OUTPUT
ENERGY

28 ECHOLON
INPUT
ENERGY

65

24

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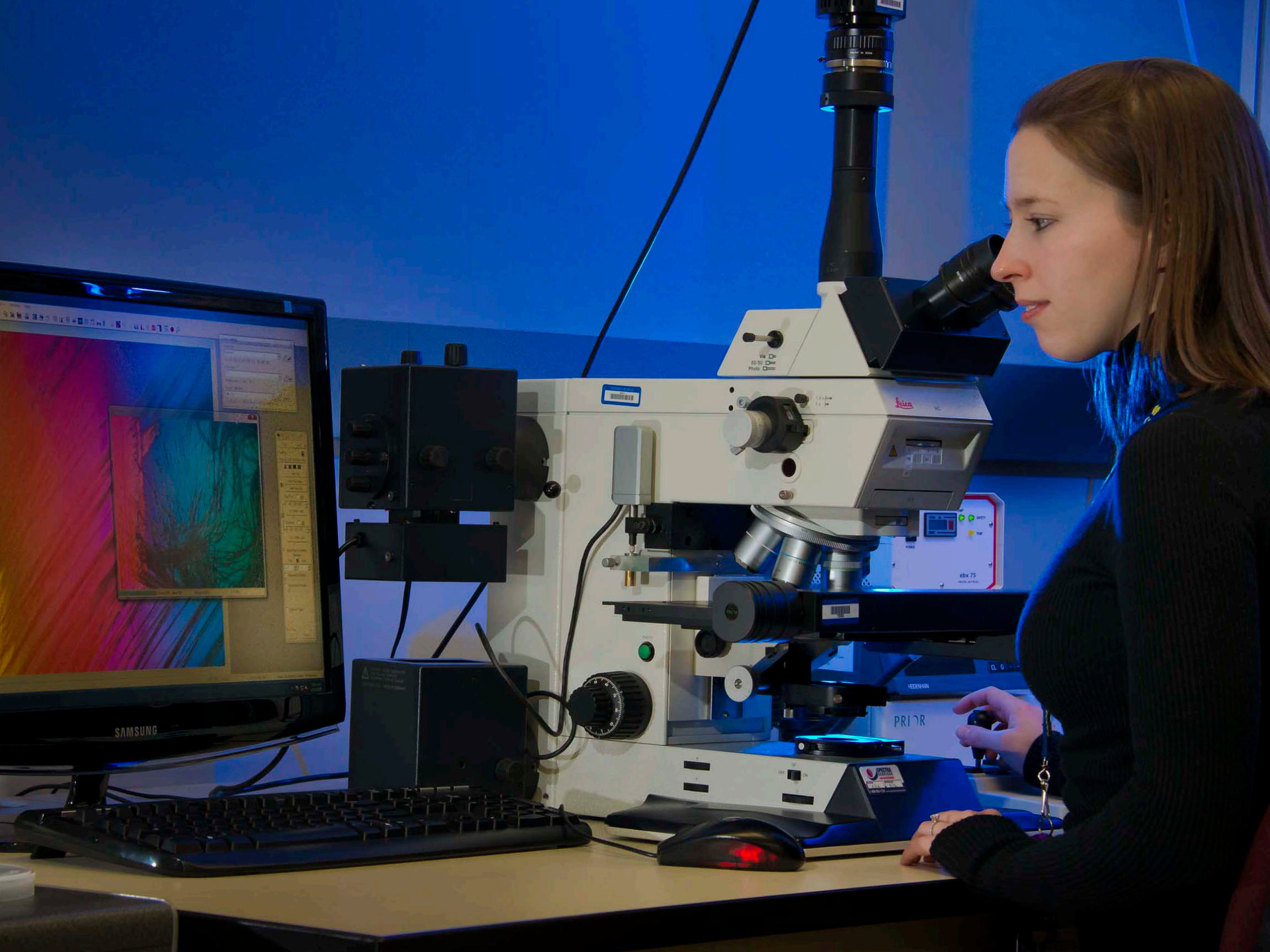
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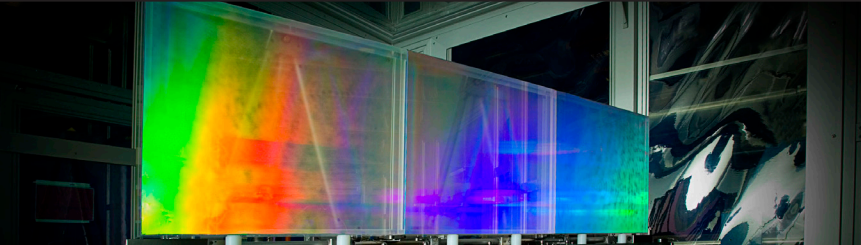
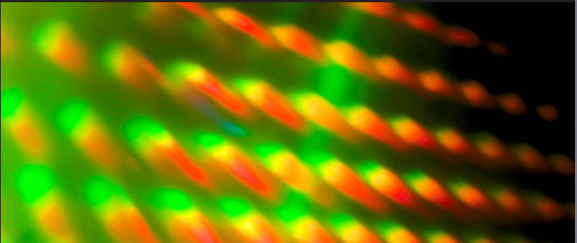
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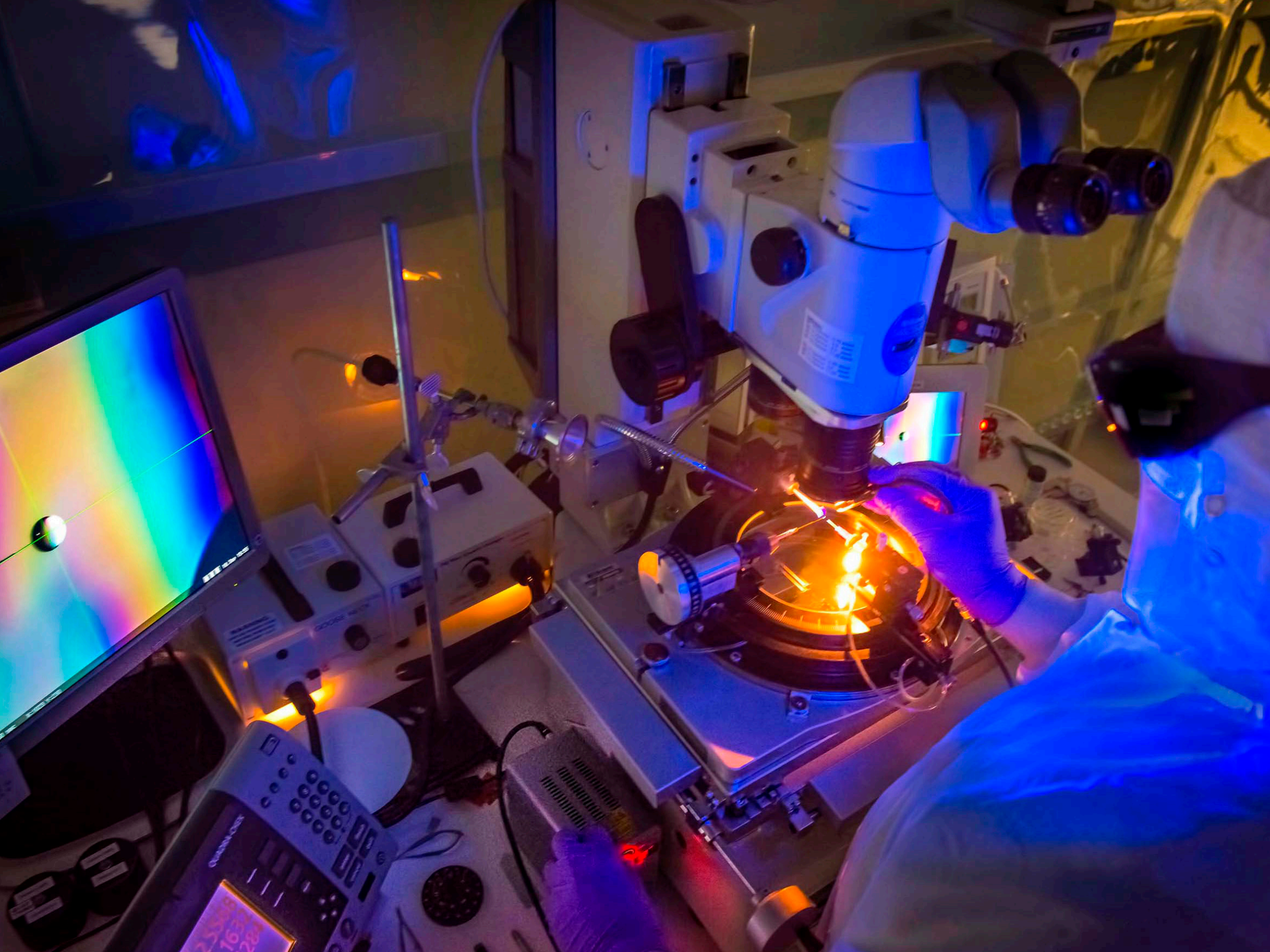
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FEBRUARY

2013



Cryogenic target assembly

A target assembler shown attaching an 865- μ m-diam capsule to a 17- μ m-diam silicon-carbide fiber. The target will then be processed in the Cryogenic Target Handling System.

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MARCH

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APRIL
2013



DOE E.O. Lawrence Award

In May 2012, Dr. Riccardo Betti accepted the Ernest Orlando Lawrence Award from Department of Energy (DOE) Secretary Steven Chu for research in fusion and plasma sciences.

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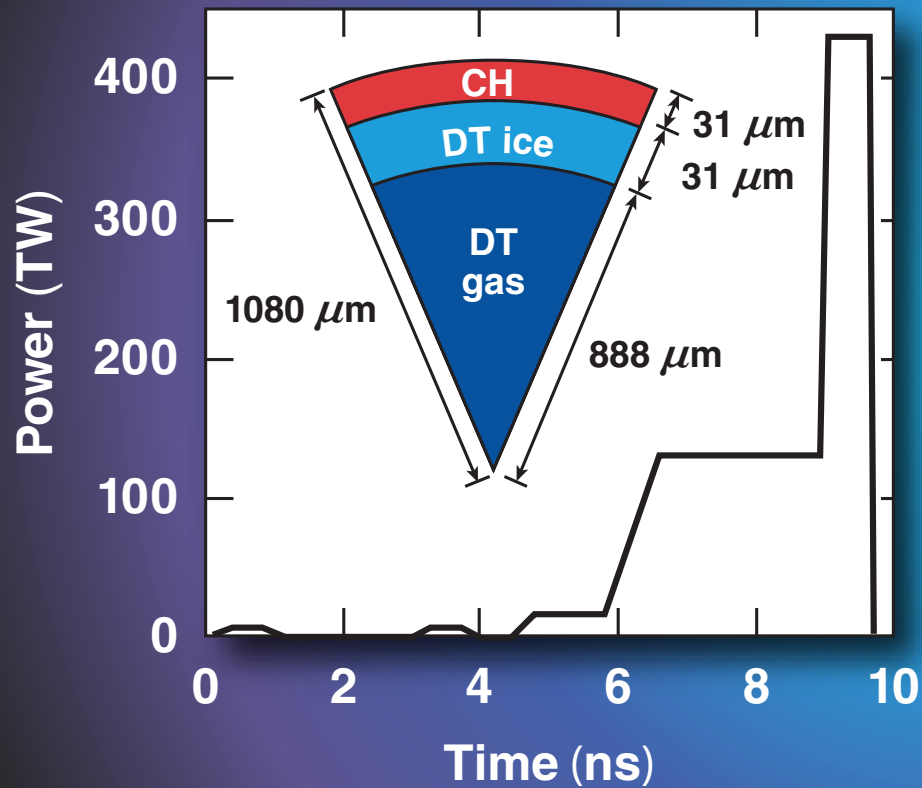
MEMORIAL DAY
UNIVERSITY HOLIDAY

MAY
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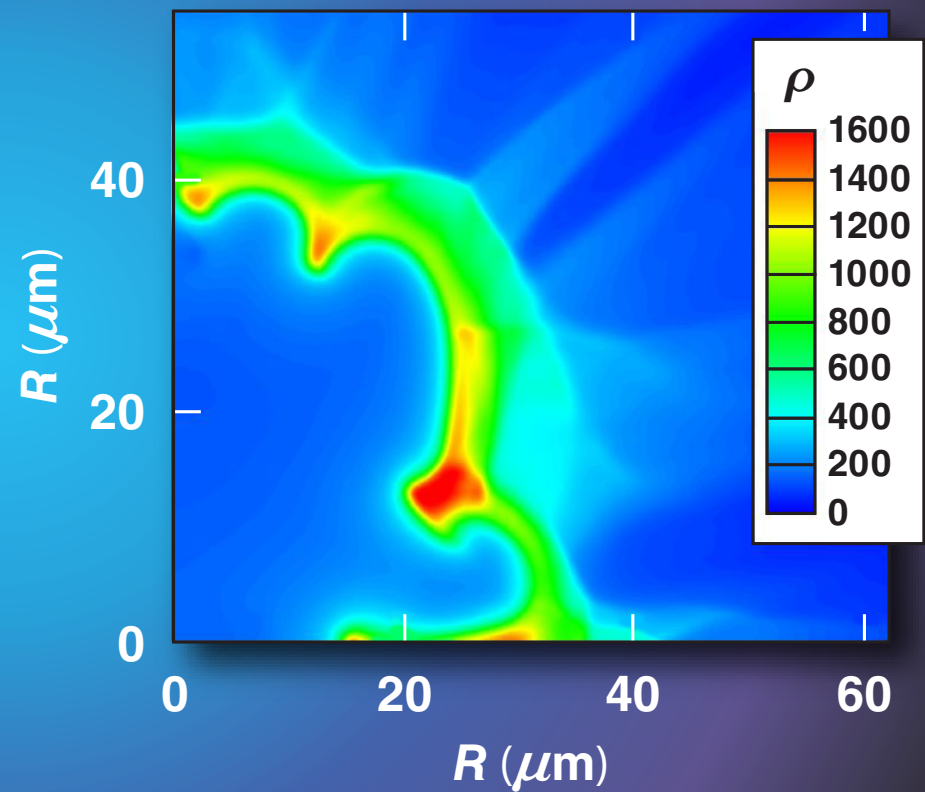
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Design pulse = 700 kJ




750 kJ, two-picket shock ignition
with polar drive and imprint gain = 45



Shock ignition

Shock ignition is a promising advanced-ignition approach being developed by LLE for possible implementation at the National Ignition Facility.

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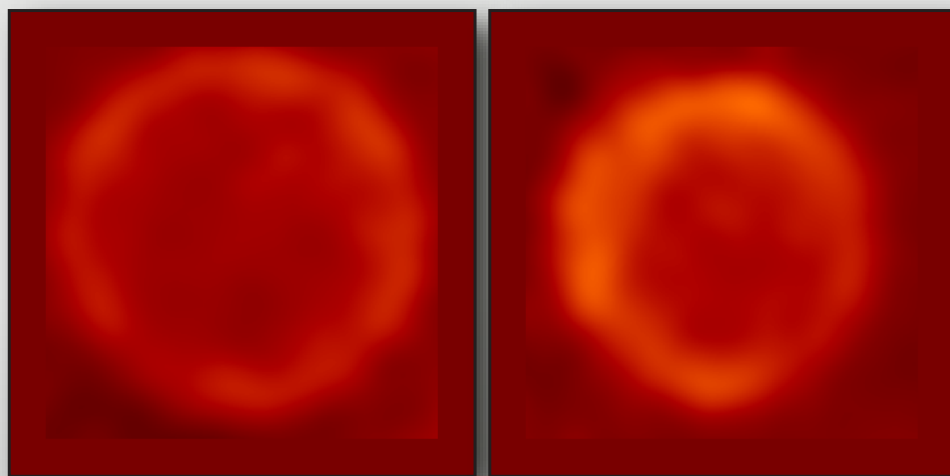
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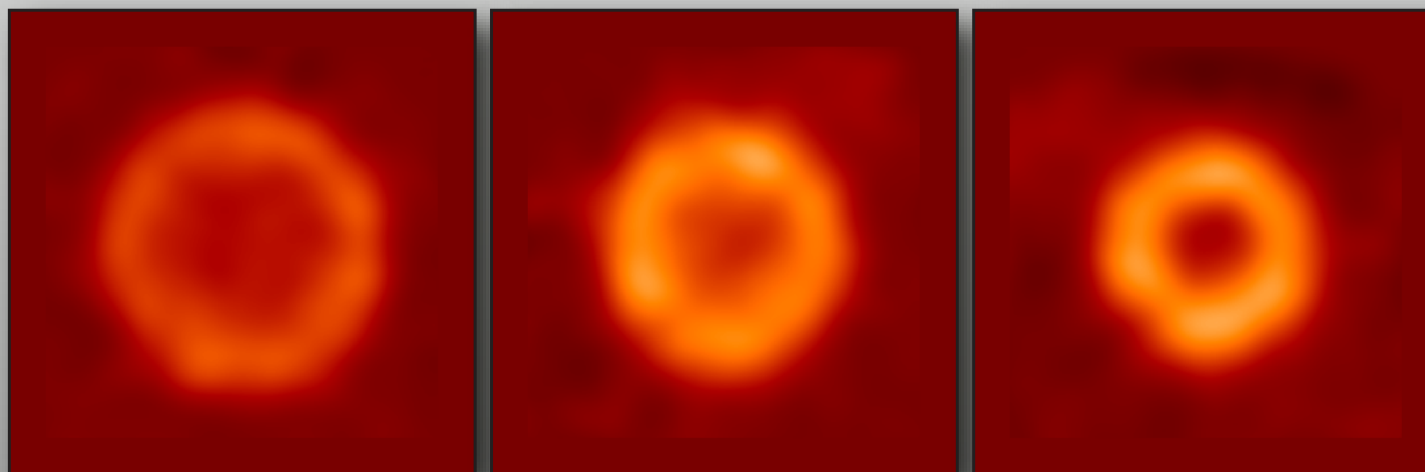


Prolate shimmed shell



2.99

3.10



3.19

3.30

3.39

Optical
depth

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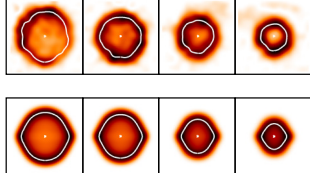
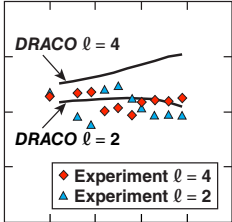
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PD implosions

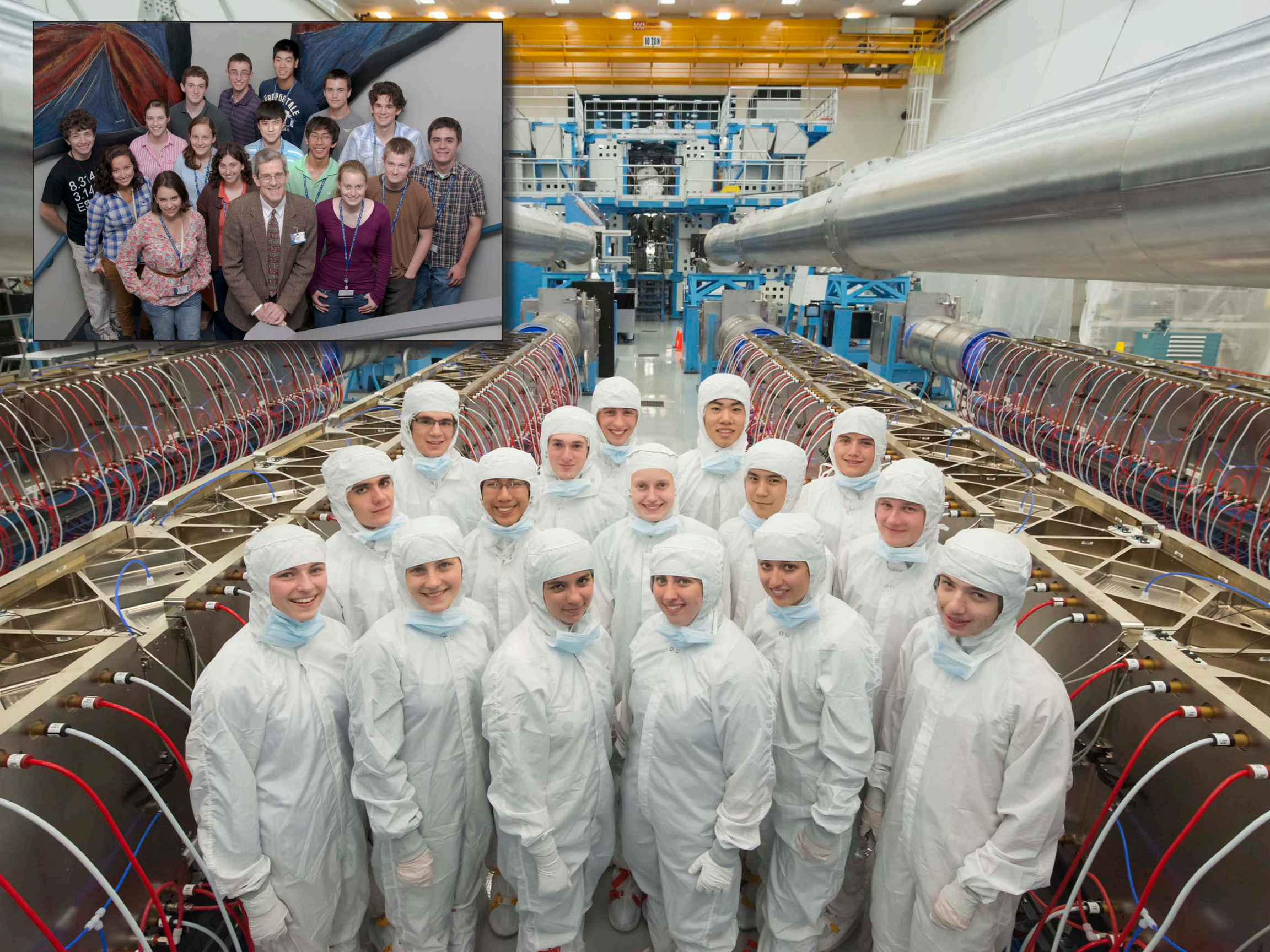
Polar drive (PD) is being developed by LLE to demonstrate direct-drive ignition on the NIF. One potential means of improving the drive uniformity with PD is to employ “shimmed targets”—targets whose thickness varies as a function of angle. Shown in the photograph above are framing-camera x-ray backlit images of a shimmed PD target implosion demonstrating its inherent drive uniformity.

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Summer High School Research Program

Participants in the 2012 Summer High School Research Program. The program challenges high school students to explore research topics and careers. The program's director is Dr. Stephen Craxton.

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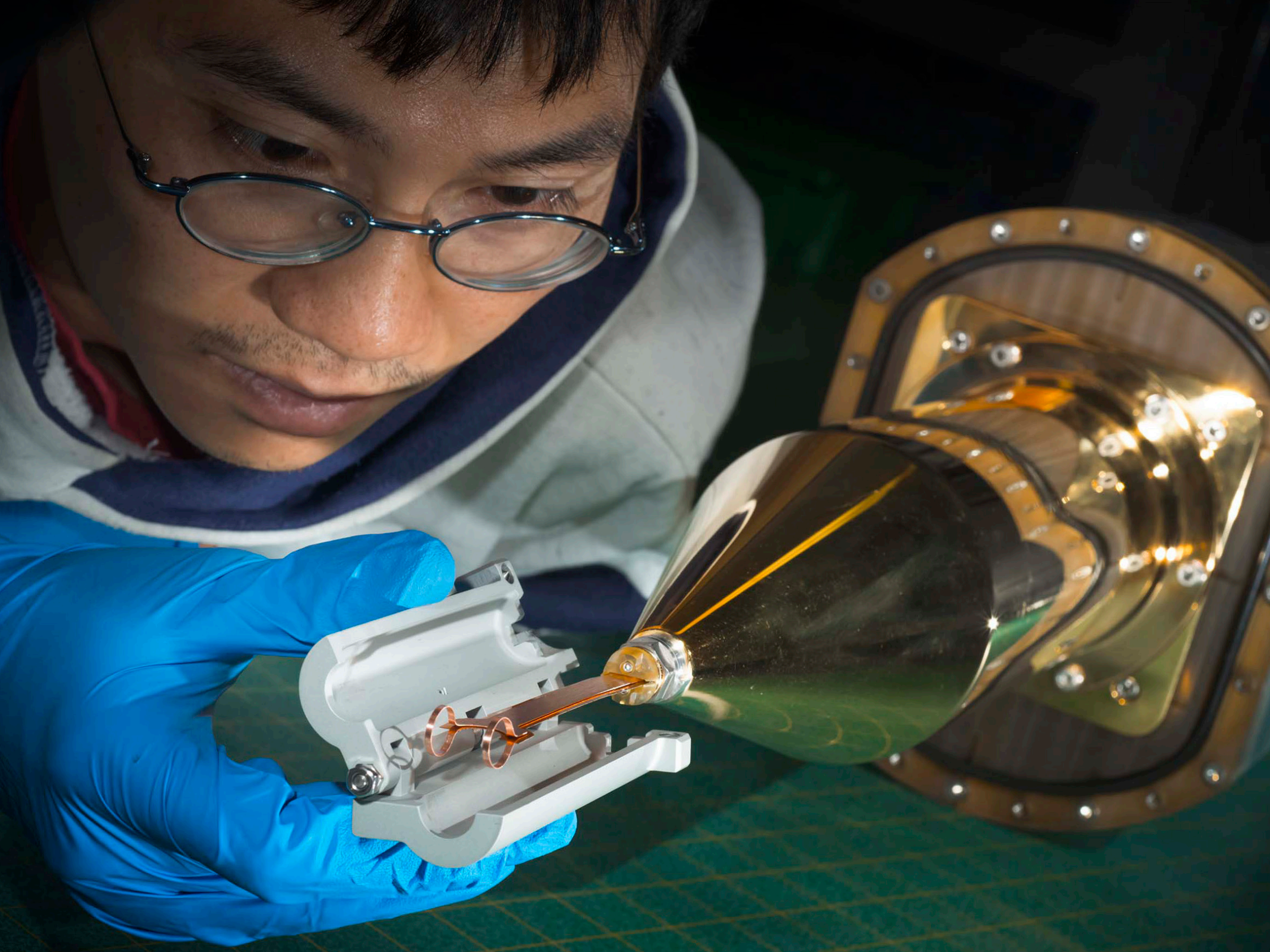
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Magnetized inertial fusion energy delivery system (MIFEDS)

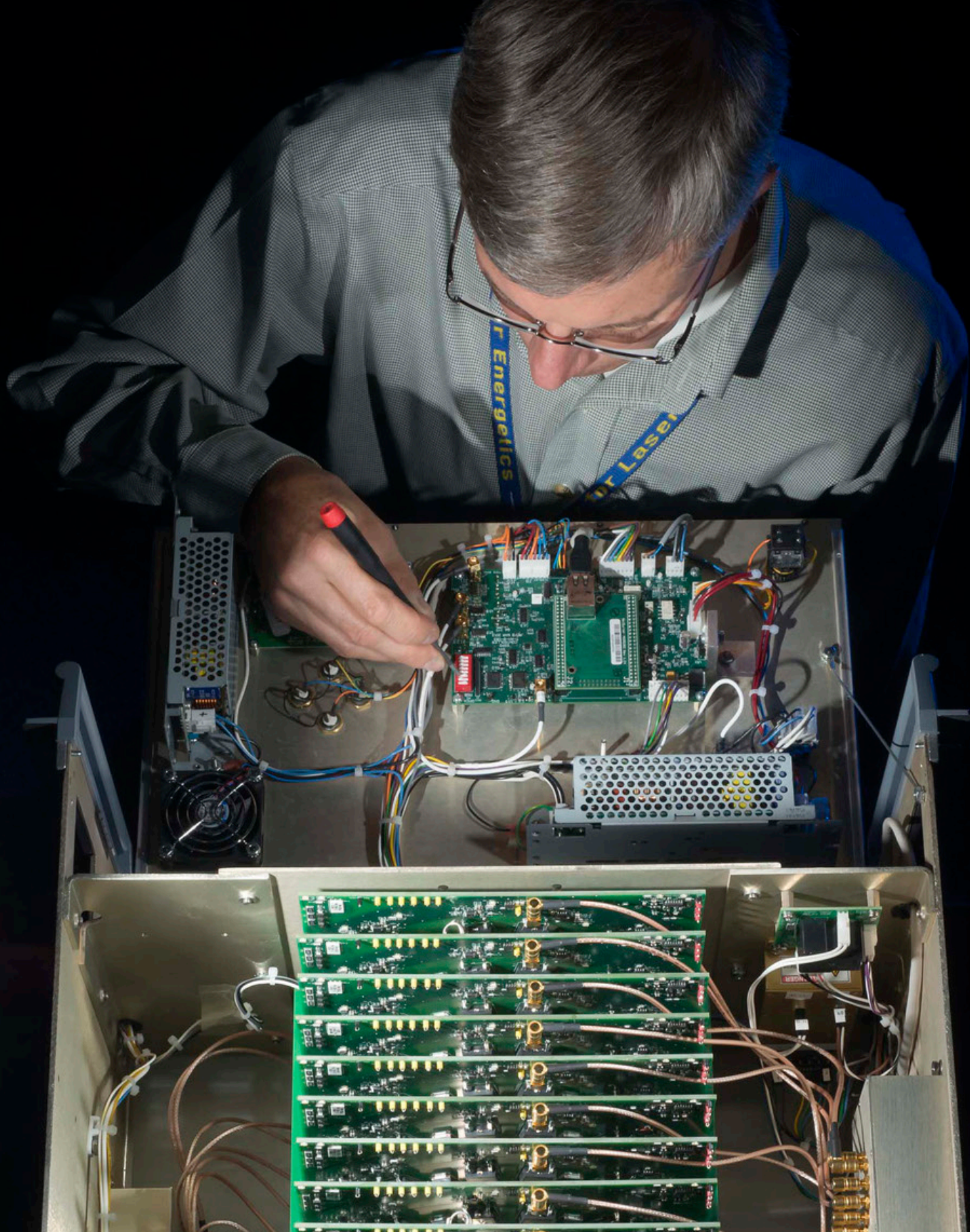
P.-Y. Chang shown inspecting the target end of the MIFEDS assembly that is used to conduct experiments on the interaction of laser-driven targets with externally imposed magnetic fields.

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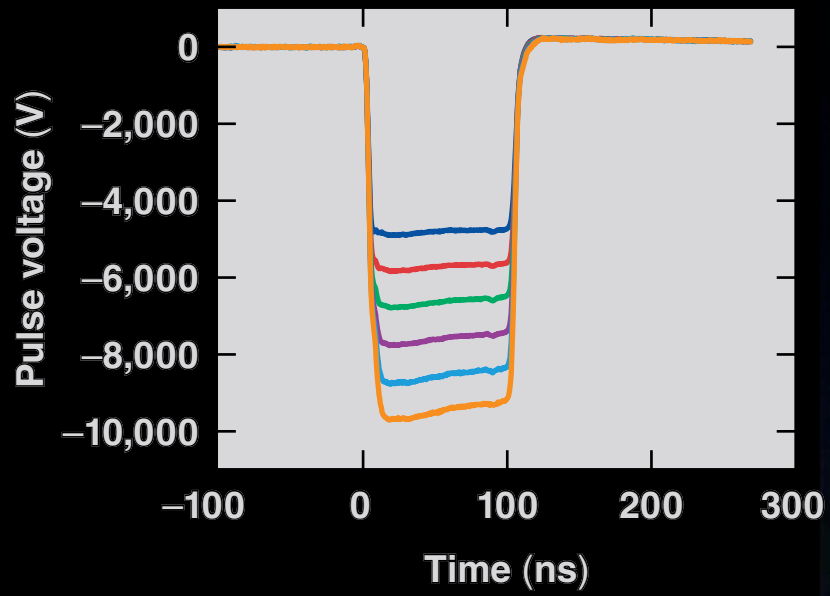
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NOVEMBER

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4ω probe beam

Senior Manufacturing Engineer Raymond Huff shown adjusting components of a 4ω probe beam assembly to be used on OMEGA EP to characterize large-scale-length laser-produced plasmas.

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27	28	29	30	31		

AUGUST

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

SEPTEMBER

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

OCTOBER

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

NOVEMBER

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

DECEMBER

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

2015

JANUARY

S	M	T	W	T	F	S
			1	2	3	
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

FEBRUARY

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28

MARCH

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

APRIL

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

MAY

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

JUNE

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

JULY

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

AUGUST

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

SEPTEMBER

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

OCTOBER

S	M	T	W	T	F	S
			1	2	3	
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

NOVEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

DECEMBER

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	