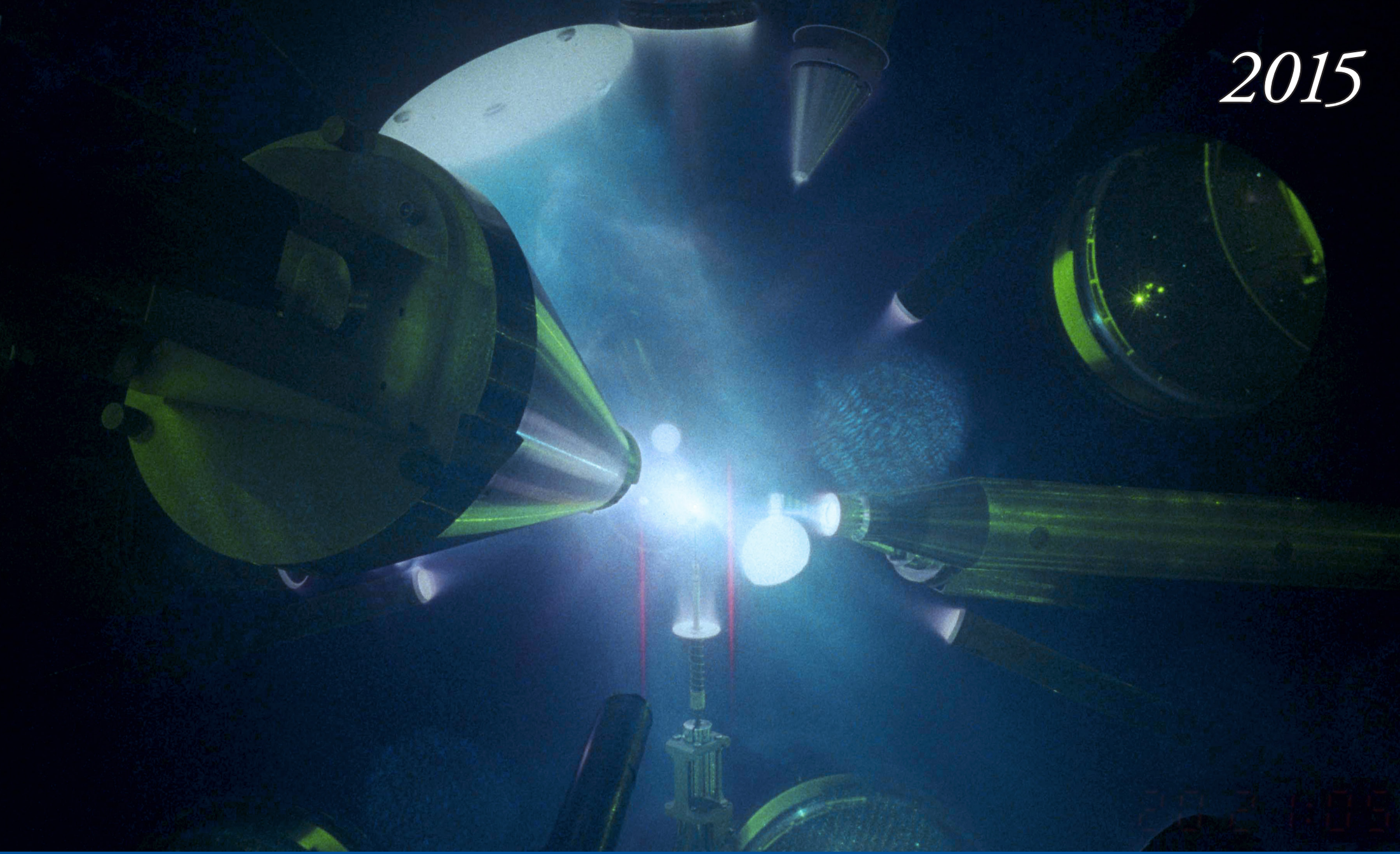


2015

LABORATORY *for* LASER ENERGETICS

University of Rochester • Laboratory for Laser Energetics

www.lle.rochester.edu

UR LLE

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, providing 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 2015 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 2015.

LLE is funded by the National Nuclear Security Administration (NNSA) to support its Stockpile Stewardship Missions.

Photography by Eugene Kowaluk

National Nuclear Security Administration

Welcome to 2015

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.

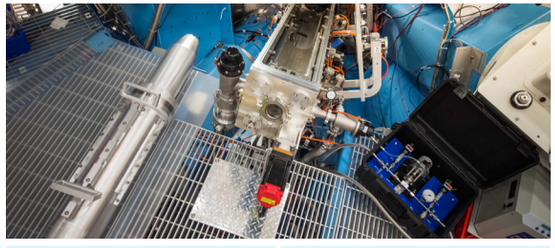
2015 will be a year of challenges and opportunities

- Ongoing pursuit of ignition and the development of ignition alternatives
- Congressionally mandated review of the National Inertial Confinement Fusion Program
- Polar-drive implosions at the National Ignition Facility
- 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
University Professor
Vice President, Vice Provost, University of Rochester
Director, Laboratory for Laser Energetics

Gas Cherenkov detector (GCD)

LLE and LANL collaborated on the development of a new gas Cherenkov detector (GCD-3) for gamma-ray spectroscopy on OMEGA. OMEGA experimental system technician (EST) Dan Neyland is shown with the GCD-3 (nearest Dan) and an earlier instrument (GCD-2) on the OMEGA target chamber platform.



DECEMBER 2014

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
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8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
				1 New Year's Day University Holiday	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

JANUARY 2015

*The dates of the various phases of the moon and the equinox and solstice dates are from the U.S. Naval Observatory data tables and are based on Universal Time (UT); see: http://aa.usno.navy.mil/data/docs/MoonPhase.php and http://aa.usno.navy.mil/data/docs/EarthSeasons.php, respectively.

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OMEGA

Graduate students

Leva McIntire (Optics Ph.D. student) aligns a programmable spatial light modulator system that will shape the intensity and wavefront of laser beams used to pump optical parametric chirped-pulse amplifiers.

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16 President's Day	17	18	19	20	21
22	23	24	25	26	27	28

JANUARY

S	M	T	W	T	F	S
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18	19	20	21	22	23	24
25	26	27	28	29	30	31

MARCH

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22	23	24	25	26	27	28
29	30	31				

FEBRUARY 2015

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TMIC-02
TMIC-01
V-13
V-12
OPEN
CLOSE
V-14
OPEN
CLOSE
V-10
V-46
MOL SIEVE
VS-07
Pd/K
VS-06

Isotope Separation System

LLE's new Isotope Separation System will provide a flexible tritium fuel supply and ensure that the purity of that fuel supply meets LLE's inertial confinement fusion program requirements.

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1	2	3	4	5	6	7
8 Daylight Savings Time Begins	9	10	11	12	13	14
15	16	17	18	19	20 Spring Equinox	21
22	23	24	25	26	27	28
29	30	31				

MARCH 2015

FEBRUARY

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15	16	17	18	19	20	21
22	23	24	25	26	27	28

APRIL

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19	20	21	22	23	24	25
26	27	28	29	30		

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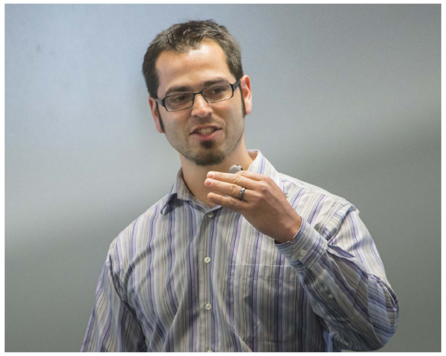
esented by:
r. Keith LeChien, Acting Dir
Office of Inertial Confinem
24, 2014



OMEGA Laser Facility Users Group (OLUG)

The Sixth Omega Laser Facility Users Group Workshop, held 23–25 April 2014, attracted 115 researchers from around the world. The next workshop will be held 22–24 April 2015.

MARCH

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22	23	24	25	26	27	28
29	30	31				

MAY

S	M	T	W	T	F	S
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3	4	5	6	7	8	9
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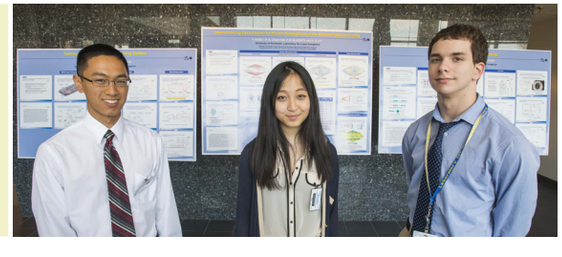
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
			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		

Omega Laser Facility Users Group Workshop at LLE

APRIL 2015

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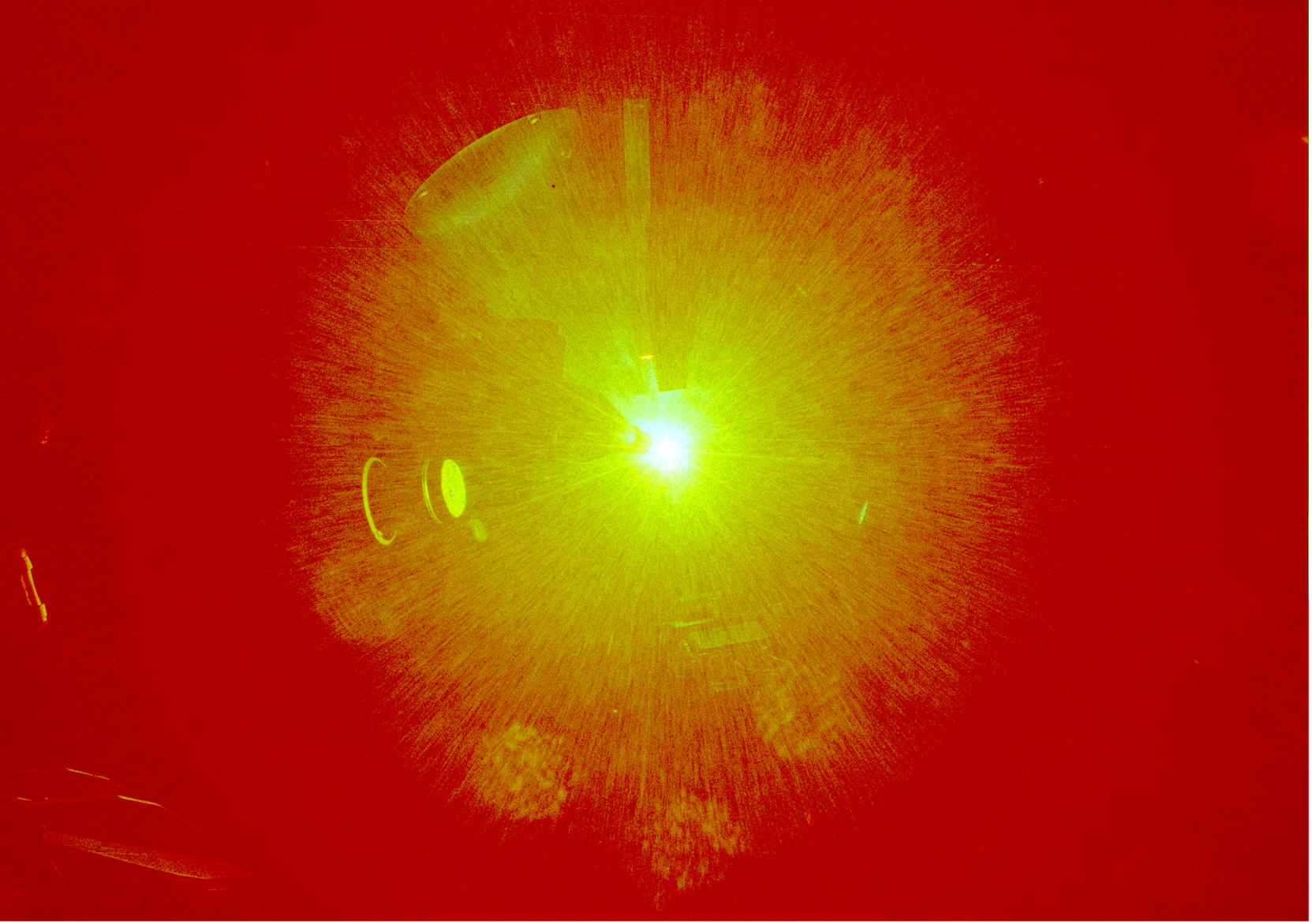
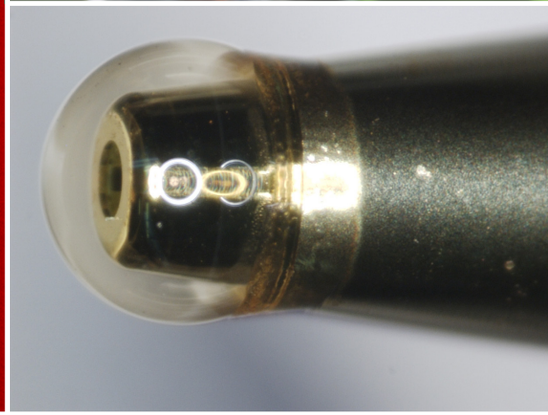
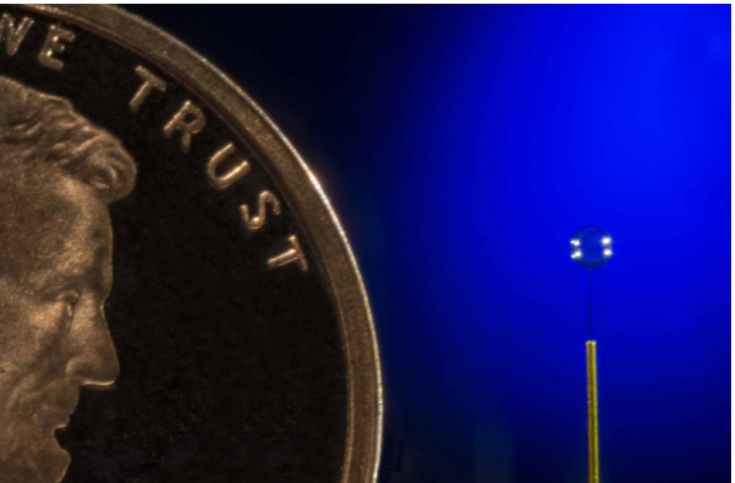
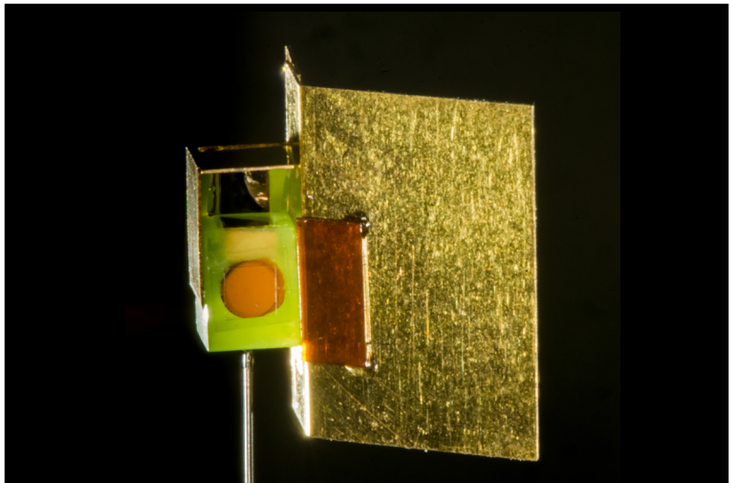
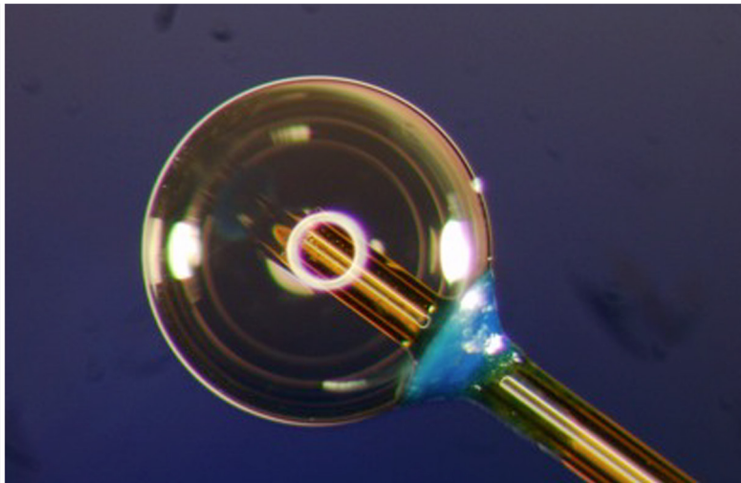





TRUST





25,000th shot on OMEGA

In 2014, the Omega Laser Facility conducted its 25,000th target shot for experiments designed to create and study extreme states of matter. Shown in the large photo above is the interior of the OMEGA target chamber during one of the target shots. The insets illustrate some of the targets routinely used for the OMEGA experiments.

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		

JUNE

S	M	T	W	T	F	S
	1	2	3	4	5	6
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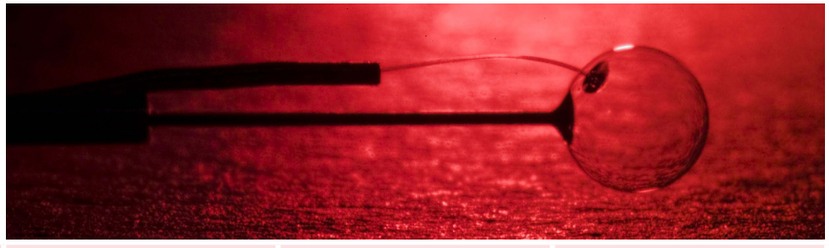
21	22	23	24	25	26	27
28	29	30				

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
					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 Memorial Day University Holiday	26	27	28	29	30
31						

MAY 2015

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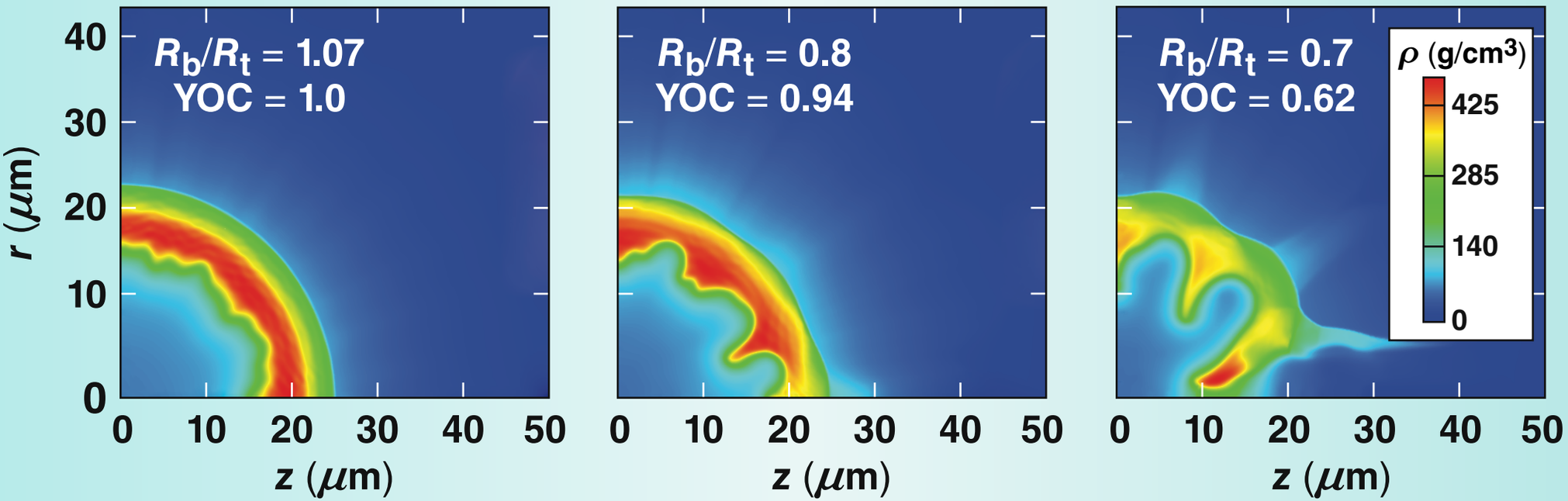
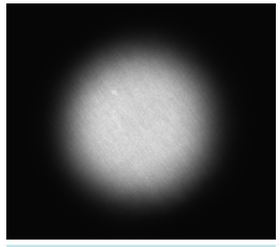
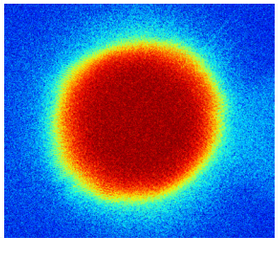
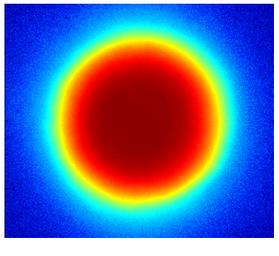

R_b/R_t = 1.07
YOC = 1.0
R_b/R_t = 0.8
YOC = 0.94
R_b/R_t = 0.7
YOC = 0.62
ρ (g/cm³)
425
285
140
0
r (μm)
z (μm)
0
10
20
30
40
50

DRACO

The *DRACO* multidimensional hydrocode is routinely used by LLE scientists to model and design target implosions. *DRACO* plots show the density [ρ(g/cm^3)] distributions at maximum compression from simulations of implosion targets illuminated by different-sized laser beams: beam radius/target radius = 1.07, 0.8, and 0.7.

JUNE 2015

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21 Summer Solstice	22	23	24	25	26 LLE Golf Tournament at Blue Heron Hills	27
28	29	30				

MAY

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24	25	26	27	28	29	30
31						

JULY

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26	27	28	29	30	31	

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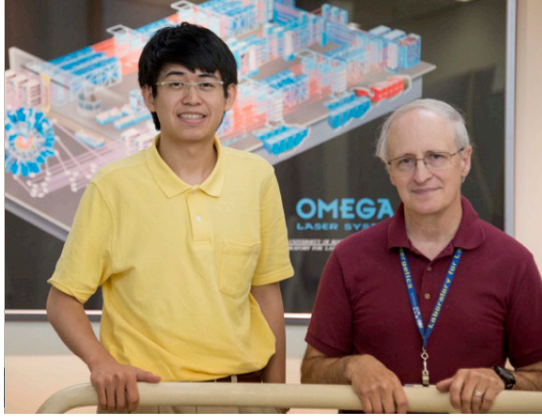
ARS ET SCIENTIA

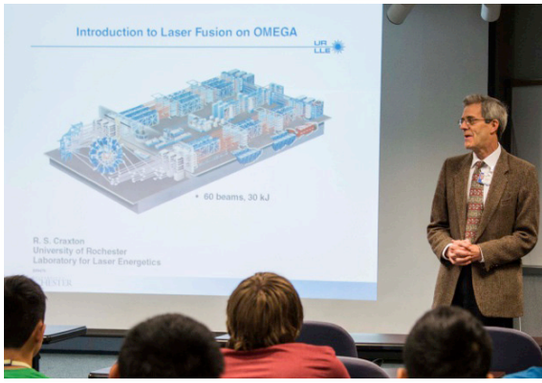
R. L. McCrory Professorship

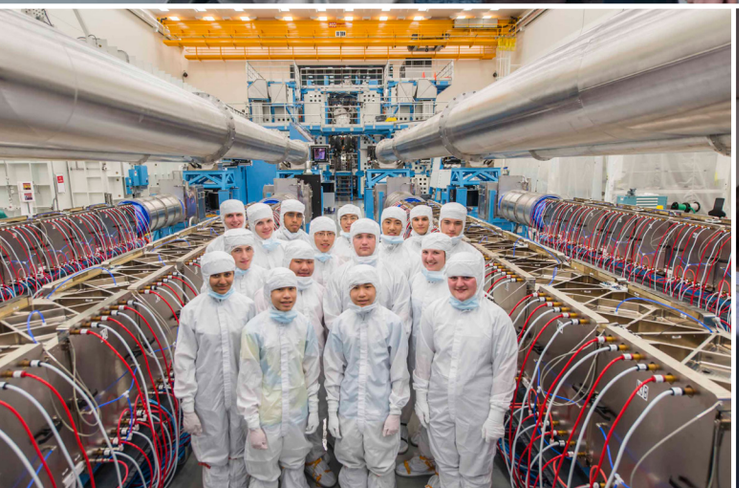
At a ceremony on 3 April, Robert L. McCrory (left) was appointed University Professor and Riccardo Betti (right) was appointed the inaugural Robert L. McCrory Professor.

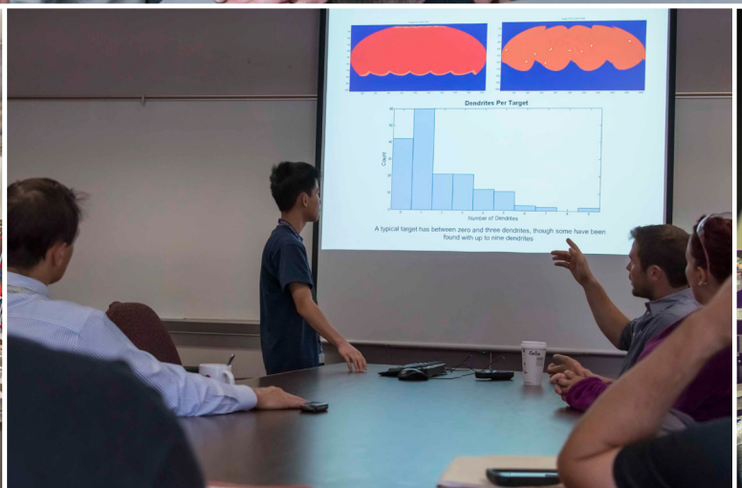
SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
JUNE S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	**AUGUST** S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31		1	2	3 Independence Day Observed University Holiday	4 Independence Day
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	

JULY 2015


OMEGA


Introduction to Laser Fusion on OMEGA
• 60 beams, 30 kJ
R. S. Craxton
University of Rochester
Laboratory for Laser Energetics




Dendrites Per Target
Count
Number of Dendrites
A typical target has between zero and three dendrites, though some have been found with up to nine dendrites

Summer High School Research Program

Participants in the 2014 Summer High School Research Program. The program provides unique research opportunities to talented regional high school students and is led by Dr. Stephen Craxton.

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
JULY	**SEPTEMBER**					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 2015

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Rebuilt MIFEDS

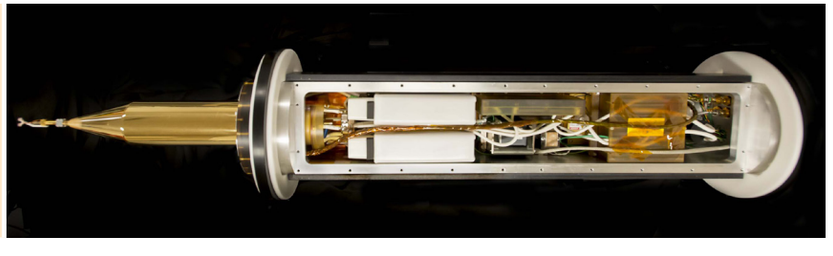
A 10-mm-diam MIFEDS (magneto-inertial fusion electrical discharge system) magnetic coil comprised of Kapton-insulated copper wire wound around a 3-D printed plastic coilform. Larry Folnsbee (LLE engineer) is assembling MIFEDS.

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					

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

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
		1	2	3	4 LLE Golf Tournament at Bristol Harbour	5
6	7 Labor Day University Holiday	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23 Autumnal Equinox	24	25	26
27	28	29	30			

SEPTEMBER 2015

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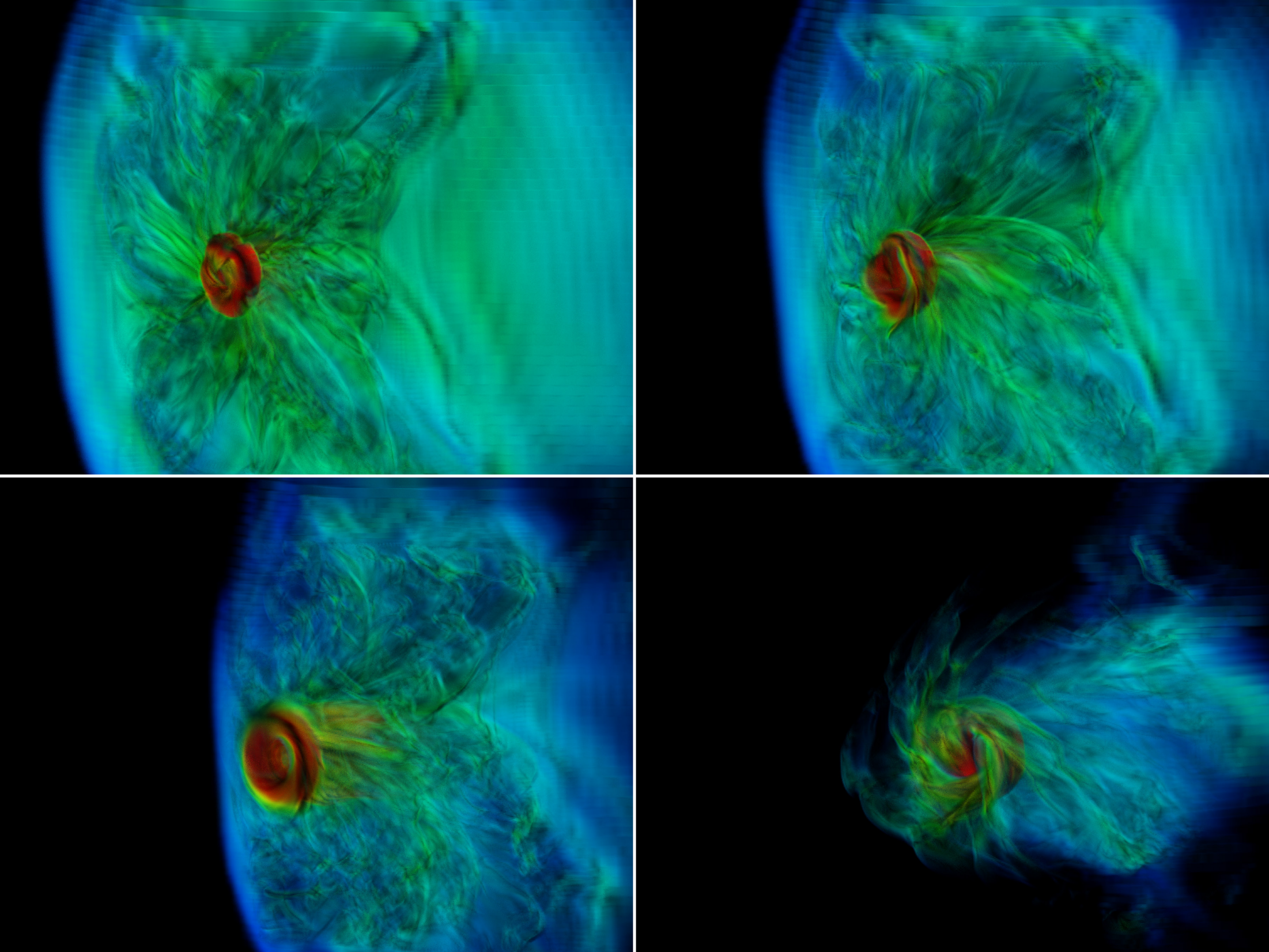

AstroBEAR

A sequence of images showing "triggered star formation," where a shock wave from a nearby supernova sweeps across a cloud of interstellar gas. The simulation was carried out with the parallel adaptive mesh refinement magnetohydrodynamic multiphysics code *AstroBEAR,* developed by the University of Rochester's computational astrophysics group led by Prof. Adam Frank, in collaboration with (and support from) LLE.

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
	**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	**NOVENBER** 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		1	2	3
4	5	6	7	8	9	10
11	12 Columbus Day	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

OCTOBER 2015

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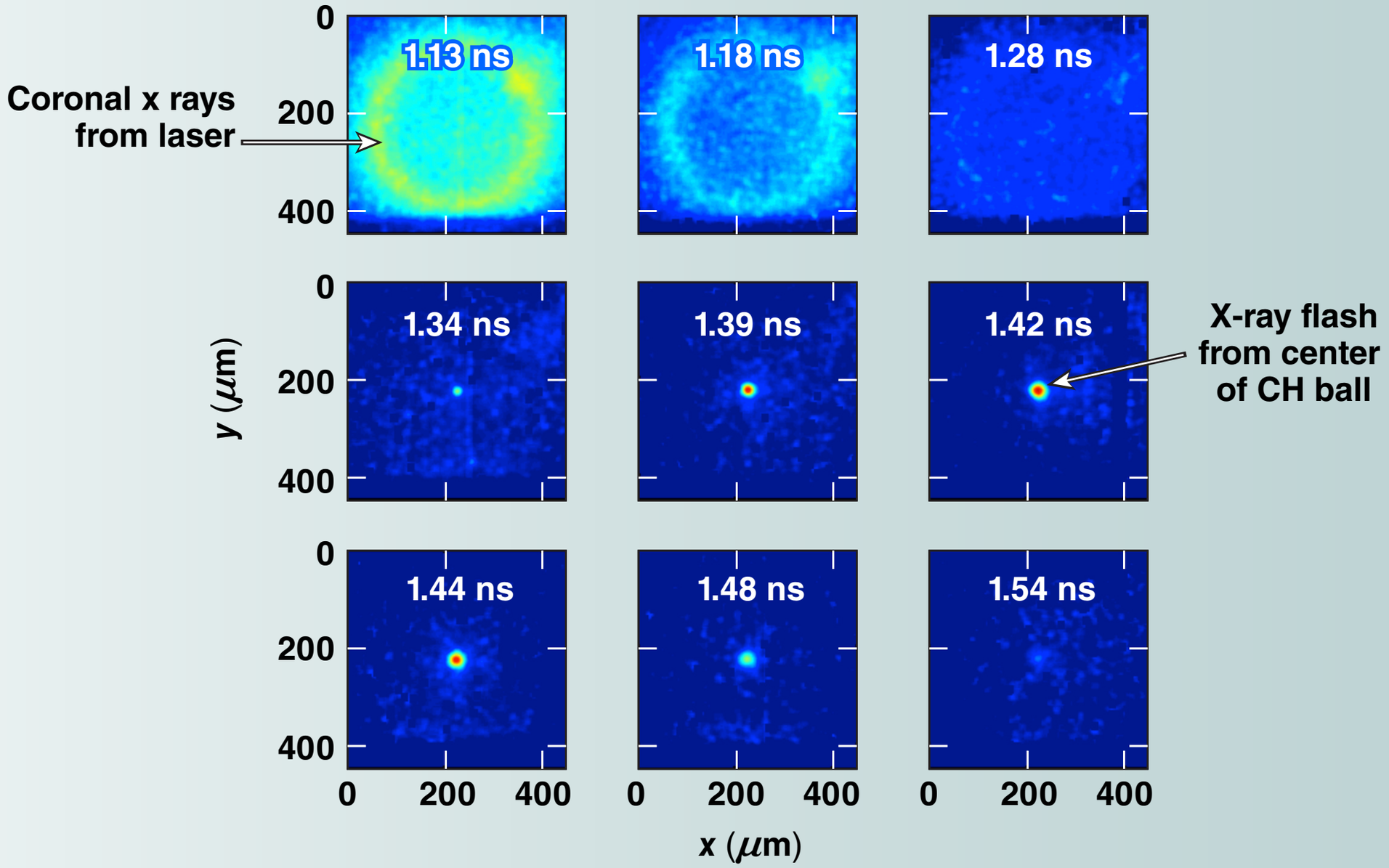
Coronal x rays
from laser
1.13 ns
1.18 ns
1.28 ns
1.34 ns
1.39 ns
1.42 ns
X-ray flash
from center
of CH ball
1.44 ns
1.48 ns
1.54 ns
y (μm)
x (μm)
0
200
400

Strong-shock experiment

OMEGA experiments generated strong shocks in solid sphere targets with peak ablation pressures exceeding 300 Mbar. The x-ray framing camera images show the early coronal x-ray emission from the target surface during the laser interaction and, later, the x-ray flash from the target center generated from the converged shock wave.

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1 Daylight Savings Time Ends	2	3	4	5	6	7
8	9	10	11 Veterans Day	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26 Thanksgiving Day University Holiday	27 University Holiday	28
29	30					

56th Annual Meeting of the APS Division of Plasma Physics in Savannah, GA

OCTOBER

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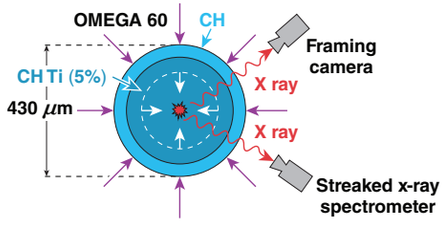
18	19	20	21	22	23	24
25	26	27	28	29	30	31



DECEMBER

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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 2015

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Photo by Jason Laurea, LLNL.
LLNL-PHOTO-661359

NIF polar drive

LLE scientist Matthias Hohenberger discussing a just-completed NIF (National Ignition Facility) polar-drive implosion. Matthias is stationed at Lawrence Livermore National Laboratory and is the Principal Investigator for the LLE polar-drive campaign on the NIF. The data is being used to validate modeling of ignition-scale, direct-drive implosions in anticipation of a polar-drive–ignition campaign by the end of the decade.

NOVEMBER

S	M	T	W	T	F	S
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15	16	17	18	19	20	21
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29	30					

JANUARY 2016

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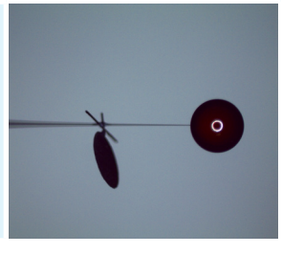
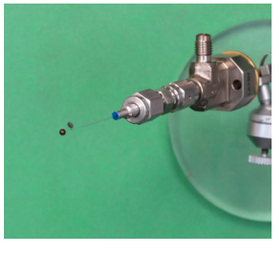
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22 Winter Solstice	23	24	25 Christmas Day University Holiday	26
27	28	29	30	31		

DECEMBER 2015

University of Rochester • Laboratory for Laser Energetics
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2016

JANUARY

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FEBRUARY

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MARCH

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APRIL

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MAY

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JUNE

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JULY

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AUGUST

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SEPTEMBER

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OCTOBER

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NOVEMBER

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DECEMBER

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2017

JANUARY

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FEBRUARY

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MARCH

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APRIL

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JULY

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AUGUST

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SEPTEMBER

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OCTOBER

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NOVEMBER

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DECEMBER

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Some photos were provided by A. Fenster, University Photographer

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