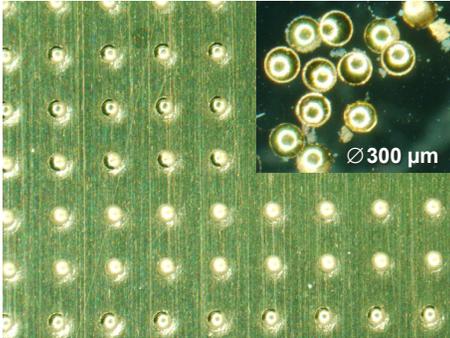


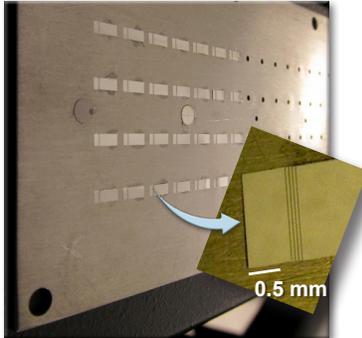
HIGH REPETITION RATE TARGETS

Target Development and Fabrication for Basic Plasma Physics and High Energy Density Science

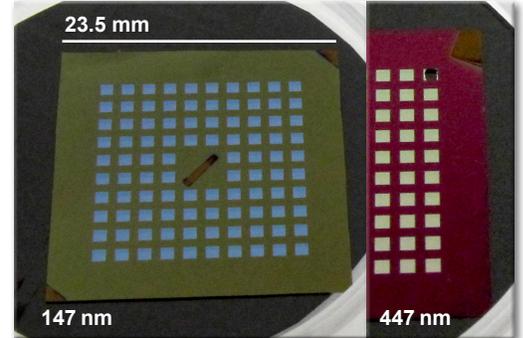
Particle Acceleration Targets Gold Hemi-shell



Shock Physics Targets Diamond Multi-Steps



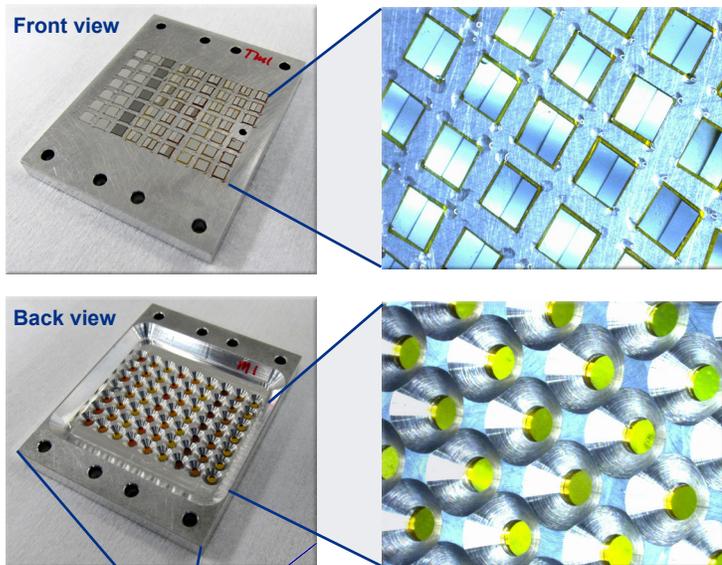
Isochoric Heating Targets Silica Window Films



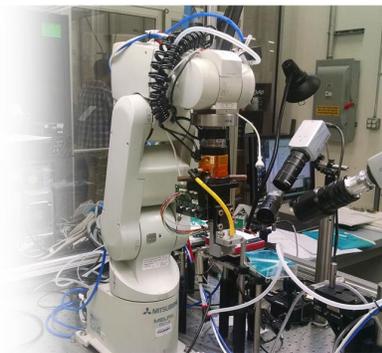
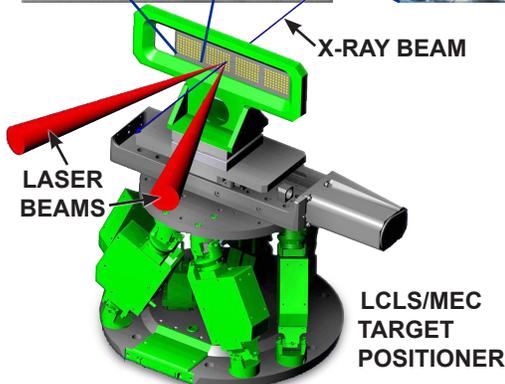
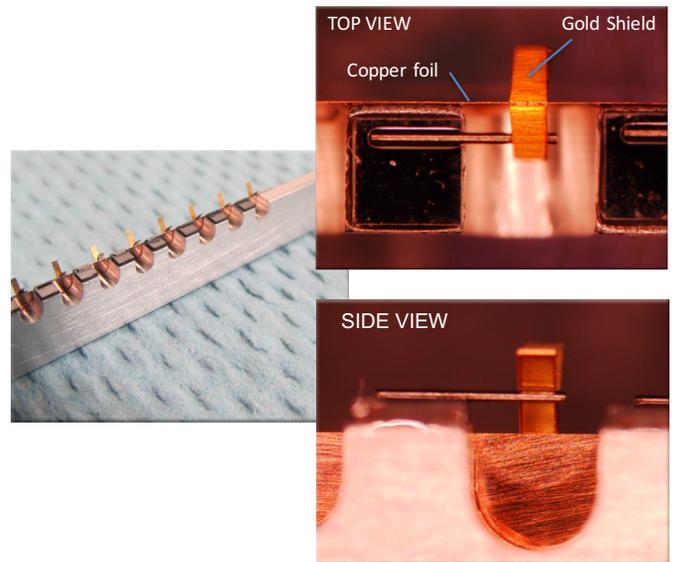
General Atomics (GA) designs and develops systems for target fabrication, assembly, metrology, and target physics diagnostics. GA experts work collaboratively to design and construct systems for target fielding and insertion, producing large quantities of targets for high repetition rate laser experiments. GA has provided large quantity targets for experiments at the Linac Coherent Light Source (LCLS) using **100's to 100,000's of targets each and has supported 16 science campaigns since 2011.**

RECENT TARGETS FIELDIED AT SLAC'S LCLS - MATTERS IN EXTREME CONDITIONS (MEC) EXPERIMENTAL HUTCH

Aluminized diamond with polyimide ablator for LL20



Gold 'V' Shield centered on edge of copper foil for LL65

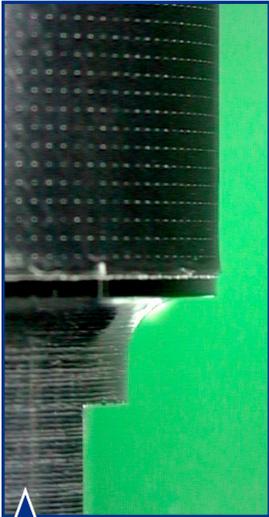


ROBOT TARGET ASSEMBLY STATION

High throughput assembly with robotics, one assembly/minute

Target Fabrication in Support of Repetition Rated Experiments at LCLS

Enabling >10 publications in high impact journals including Nature Photonics and Phys. Rev. Lett.



Characterization capabilities

- Optical microscopy
- Optical and contact profilometry
- X-ray absorption spectroscopy
- Fluorescence spectroscopy
- X-ray and optical reflectometry
- X-ray tomography
- Scanning electron microscopy

Fabrication capabilities

- Micro-machining: multi-axis milling and turning
- Laser machining, marking, and micro-drilling
- Thin film coating: polymers, metals, and alloys
- Target assembly: manual and automated robotic
- Electro-plating and electro-forming
- Lithography: DUV mask alignment, reactive ion etching
- Chemical synthesis: polymer, metal, metal oxide foams & aerogels

Simulation

- Target physics codes (FLASH, FLYCHK, ITS, VISRAD) for design and data interpretation

GA HAS PROVIDED TARGETS FOR 16 LCLS EXPERIMENTS

Target description	Qty delivered	LCLS Exp.	Year
Al microdots, and Al and Mg foils on rotating cylinders	236,828	L332	2011
Al & CH coated pillars for phase contract imaging	225	*Dev.	2012
Fe, Al, quartz, fused silica, Si _{<110>} , poly-silicon phase contrast imaging foils	350	*Science	2013
CH, HDC, Al/CH, Mg/CH, Al steps, Mg steps, pinholes, YAG screens	280	LA61	2013
CH/Al coated carbon foils of various types and fused silica VISAR windows	241	*Science	2014
Diamond multiple steps and alignment crosshairs	31	Laser-only	2014
Ti/Cr alloy targets on aluminized fused silica with Cu/CH cladding	75	LD67	2014
CH foils for x-ray Heterodyne speckle imaging	16	LC80	2014
Gold shield bent foil assembled onto thin edge of Cu foil	40	LC65	2014
Al microdots array embedded in CH	92	Laser-only	2014
FeO, Fe ₂ O ₃ , & Fe ₃ O ₄ powder targets and CH and Al coated plagioclase disks	330	*Science	2015
Robotically mounted targets to mounting plates	967	LG30	2015
SiO ₂ coating (150, 450 nm) onto silicon nitride window (50 nm) arrays	966	LG84	2015
Robotically assembled aluminized diamond with polyimide ablator	244	LL20	2016
Al coated with CH and gold coated windows	31	LL82	2016
Aluminized CH and CH ₂ , some with LiF windows	320	LL58	2016
		* = In house	



ISO 9001-2008 certified

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