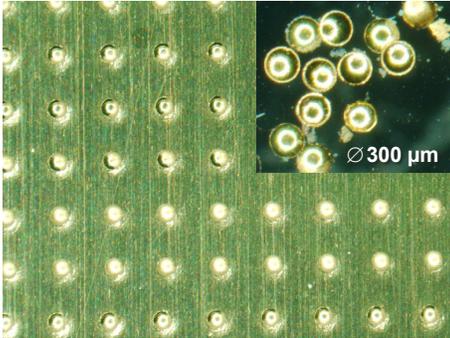


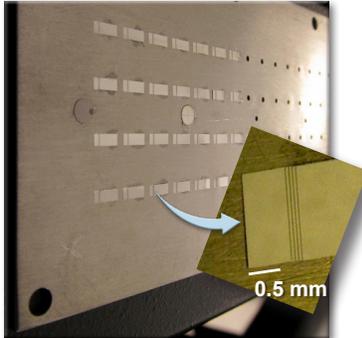
HIGH REPETITION RATE TARGETS

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

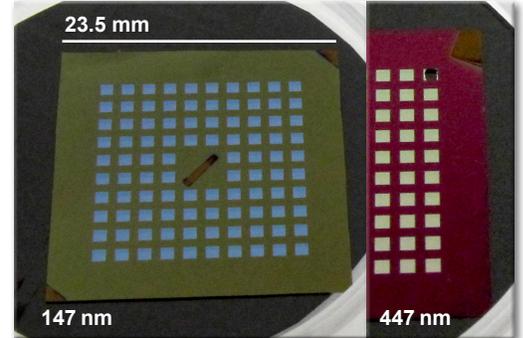
Particle Acceleration Targets Gold Hemi-shell



Shock Physics Targets Diamond Multi-Steps



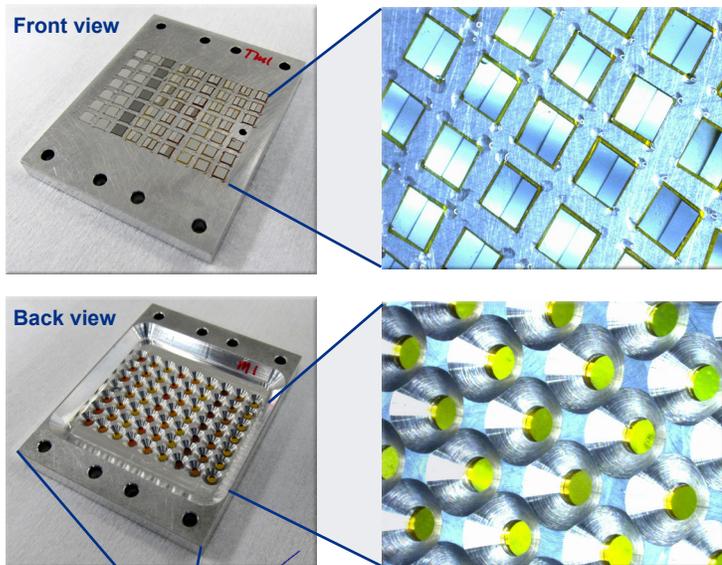
Isochoric Heating Targets Silica Window Films



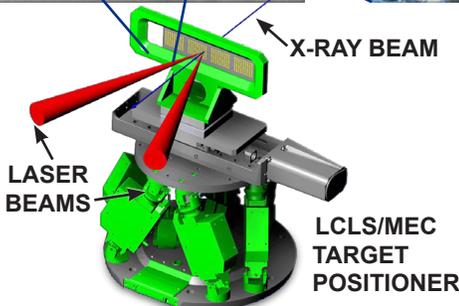
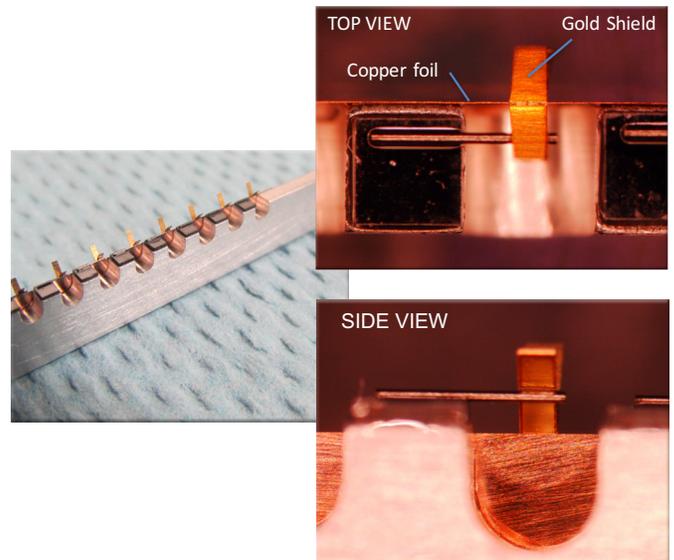
General Atomics (GA) designs and develops systems for target fabrication, assembly, metrology, and target physics diagnostics. GA experts work collaboratively to design and construct systems for target fielding and insertion, producing large quantities of targets for high-repetition-rate laser experiments.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

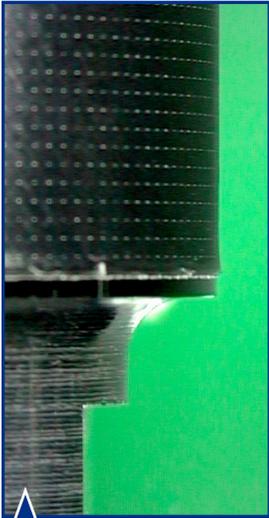


ROBOT TARGET ASSEMBLY STATION

High throughput assembly with robotics, one assembly/minute

Target Fabrication in Support of Repetition-Rated Experiments

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

Simulation

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

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

GA HAS PROVIDED TARGETS FOR MANY REP-RATE EXPERIMENTS

Target Description	Quantity Delivered	LCLS Exp.	Year
Al microdots, and Al and Mg foils on rotating cylinders	236,828	L332	2011
PCI coupons on notched pillars in Fe, Al, quartz, fused silica, Si 110, poly-silicon	350	IH Science	2013
CH, HDC, Al/CH, Mg/CH, Al steps, Mg steps, pinholes, YAG screens	280	LA 61	2013
PN/Al coated carbon foils of various types and fused silica VISAR windows	241	IH Science	2014
Ti/Cr Alloy targets on aluminized fused silica with Cu/CH cladding	75	LD 67	2014
GDP squares for x-ray Heterodyne speckle imaging	16	LC 80	2014
FeO, Fe ₂ O ₃ , & Fe ₃ O ₄ powder targets and plagioclase disks with PN and Al coatings	330	IH Science	2015
Thin coating of SiO ₂ onto silicon nitride window arrays	966	LG 84	2015
Aluminized diamond with polyimide ablator, quartz window; robot assembled ablators to diamond chips	244	LL 20	2016
Al diamond chips with parylene N	30	LP 34	2017
Cu micro-wires on cylinders	19479	LS 66	2017
Target Description	Quantity	Exp.	Year
2 PP microtube arrays	55	Phelix	2018
2 PP cartridge microtubes	60	VEGA	2019
2 PP microtubes	100	CSU	2019

(2 PP – 2 photon polymerization additive manufacturing)



ISO 9001-2015 certified

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