

Targetry – Requirements, Fabrication, Characterization and Deployment



- Ø Understanding the requirements
 - Develop a mutual understanding of capabilities among experimentalists, theoreticians, laser scientists and target scientists
- Ø Target fabrication
 - Sustain dedicated target laboratories for fabrication and R&D. Rather costly equipment but experience is decisive, short term contracts are not an option
- Ø Characterization
 - Vital both to fabrication process and the deployment procedure, alignment of individual targets at the experiment
- Ø Deployment
 - High repetition rate and medium repetition rate experiments: In situ target fabrication or injection, insertion, ...
- Ø Impact Analysis
 - Debris mitigation, radioactive & chemical hazards, vacuum, ...





To enhance visibility ...





Attendees at the formation meeting of TSN, June 2016, England

Current Members of TSN





- Ø Over 100 years combined targetry experience
- Ø More than 400 commercial contracts supplied internationally
- Ø We welcome new members!



Lead the development of a laser targetry strategy within Europe

Engage at an early stage with academic and industrial partners to identify opportunities for targetry development

Coordinate funding applications for large scale disruptive targetry technology grants

Educate and engage the end user community and disseminate targetry knowledge

Targetry solutions from STFC and Scitech Precision Ltd

- Complex Target Assemblies
- Gas Cell Targets
- MEMS expertise for High Rep Rate
- MEMS for high specification
- Academic access for Large Facilities (LMJ, Orion, LLE)
- Target Delivery Systems











Chair of experimental physics – medical physics





LMU target fabrication – controlled production & characterisation

Atomic force, confocal, whitelight interferometric microscopy





3-50 nm DLC foils 10nm-3µm Formvar







5 nm+ Gold

Isolated targets



06.06.18

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Laser Plasma Technologies

www.sourcelab-plasma.com





Targets for Laser and Particle Beams

1mm

50 µr



- Ø B-Field
- Ø Hohlraum targets
- Ø Thin film targets
- Ø Targets for WDM experiments
- Ø Back-lighter targets
- Ø Support-structures & shielding
- Ø Targets to test fast ignition concepts
- Ø Engineered surfaces
- Ø Mass limited targets

1mm

Targetry enabled breakthroughs with laser playing supporting role

J. Bin et al. **PRL 2018, PRL 2015** RPA enhance by relativistic selffocusing



M. Bailly-Grandvaux et al. **Nat. Comm. 2018** Guiding of relativistic electron beams in dense matter by laserdriven magneto static fields.



G.G. Scott et al. **PRL 2018** Dual Ion Species Plasma Expansion from Isotopically Layered Cryogenic Targets





Hilz et al. Nat. Comm. 2018 Isolated proton bunch acceleration by a petawatt laser pulse



J.J. Santos et al. Physics of Plasmas 2018

Laser-driven strong magnetostatic fields with applications to charged beam transport and magnetized high energydensity physics



GSchaumann@ikp.tu-darmstadt.de

17th – 20th September 2018, Darmstadt, Germany **7th Target Fabrication Workshop**

www.targetfabrication.eu

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Targetry Research Topics at 7th TFW



- Ø Thin film fabrication and coating applications
- Ø Engineered surfaces, porous and low density materials
- Ø Micro-machining, laser-machining and rapid prototyping techniques
- Ø MEMS fabrication techniques
- Ø Semi automated fabrication and robotic component assembly
- Ø Specialized characterization techniques and target alignment
- Ø Gas & liquid jet targets, cryogenic targets
- Ø Targetry solutions for high repetition rate laser systems
- Ø Strategic response to new facility development and demand

Summary & Outlook



- Ø Microtargetry is a fundamental capability that enables science from high energy/intensity drivers
- Ø High repetition rate microtargetry will require disruptive technologies and will be a major enabler for the exploitation of high rep rate drivers for both science and applications
- Ø The TSN consists of a number of long-established, coordinated labs that have the know how (but possibly not yet the resource) to meet the user community's future needs for most drivers
- Ø We are actively seeking engagement with the user community to develop solutions to your challenges!



On behalf of the Target Fabrication Workshop organising committee, it is a pleasure to announce the 7th Target Fabrication Workshop which will take place at Technische Universität Darmstadt, Germany.

Oral and poster presentations will be given on the fast developing science of Target Fabrication with applications in laser science and related fields. Please encourage colleagues and the younger research generation to attend this meeting.

> Further details and workshop registration at www.targetfabrication.eu. For informal enquiries please contact: TFW2018@ikp.tu-darmstadt.de

> > www.targetfabrication.eu



targetry suppliers network



POLITECNICO MILANO 1863

Preliminary announcement of the 4th Targetry Workshop

Targetry for high repetition rate laser-driven sources

Monday 10th - Wednesday 12th, June 2019 Politecnico di Milano, Milano, Italy



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Mai 2018 - EUCALL meeting | Gabriel Schaumann

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