

Foreword

Special Issue Featuring Papers from the 25th Target Fabrication Specialists Meeting

Guest Editors

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We are pleased to present this special issue of *Fusion Science and Technology* (FST) based on the agenda of 25th Target Fabrication Specialists Meeting, held in San Diego, California, August 25–29, 2024, hosted by General Atomics. The event brought target specialists together in person again for the first time in several years since the COVID-19 pandemic and marked the first such meeting since the achievement of the long-awaited ignition event at the National Ignition Facility (NIF) with the renewed interest in inertial fusion energy.

The four-day meeting covered the diverse aspects of fabricating targets for experiments on high-power, high-energy laser and ion facilities. Topics included ignition targets and achieving ignition; cryogenic targets; component development, fabrication, assembly, and metrology; target handling systems; DT layer formation and characterization; capsule fabrication and properties; high-energy-density targets, including materials development and processing; materials development and metrology; as well as mass production of targets for IFE.

The meeting was attended by 155 engineers, scientists, physicists, and technologists representing institutions including the National Nuclear Security Administration, the Atomic Weapons Establishment, the French Atomic Energy Commission, General Atomics (GA), the University of Rochester's Laboratory for Laser Energetics, Lawrence Livermore National Laboratory (LLNL), Los Alamos National Laboratory, LUXEL, ManTech, Sandia National Laboratories, the Science and Technology Facilities Council, the University of Nebraska–Lincoln, the University of Michigan, and Osaka University, as well as several private fusion companies such as Xcimer, LaserFusionX, Blue Laser Fusion, and Marvel Fusion.

The conference featured 56 oral technical presentations and an additional 72 poster technical presentations.

Understandably, ignition was a hot topic at the meeting, including talks on physics and the target fabrication technology improvements that led to ignition. There were core sessions on advancements in capsule fabrication and metrology, new developments in assembly techniques, low-density foams, and additive manufacturing and materials developments.

The 17 manuscripts presented in this special issue span the topics covered at the meeting. The three most active areas of research reported here include coatings, capsules, and radiography. Coatings have been a very busy area of research lately, in topics such as developing new coating techniques and new metrology techniques, as well as the coating of challenging geometries. Materials development work has focused on processing and machinability through infiltration as well as unique doping. X-ray analysis has continued to be ripe for developments in characterizing targets that span the periodic table in atomic densities, automation of feature detection, and improvement of the metrology quantification of target geometry.

As is traditional for this meeting series, the Larry Foreman Award was presented to an individual who has made a substantive contribution toward innovation and excellence in target fabrication. The award was shared this year by Suhas Bhandarkar (LLNL) and Jay Crippen (GA) for extraordinary target fabrication research and development and production of capsule fill tube assemblies that are at the heart of ignition targets at NIF.

We want to convey very special thanks to the staff at General Atomics, especially Neal Tomlin, Kasandra Moran, and Carolyn Isherwood, for their tireless efforts in planning the meeting and ensuring that it ran smoothly.

The editors would also like to thank the authors for their hard work and willingness to write these

manuscripts. As we keep pushing forward the technologies that are required to meet the challenges of inertial confinement fusion and high energy density beyond ignition with more of an eye toward the application of such platforms, we hope that the readers can

benefit from the research performed and innovations realized by the authors and will contribute to the upcoming 26th Target Fabrication Specialists Meeting—planned for Monterey, California, August 23–27, 2026.