

MIPSE Early Career Award



**Wednesday
September 16, 2026
3:10 pm
Room 1003 EECS**

Dr. Alison Christopherson Xcimer Energy Corporation

Xcimer's Approach to Inertial Fusion Energy

Xcimer Energy Corp. is developing a new generation of large-scale, high-efficiency excimer laser systems designed to enable practical inertial fusion energy. This talk will outline the physics and engineering foundations of high-energy KrF laser architectures and their advantages for coupling energy to direct-drive fusion targets. This presentation will describe Xcimer's integrated roadmap for de-risking and scaling the technology. These strategies include the Phoenix program to demonstrate and validate gas optics performance; Anvil, Xcimer's first dedicated target-shooter facility to derisk two beam implosion; and Vulcan, a 4-MJ-class laser system intended to demonstrate fusion breakeven. The seminar will also introduce Athena, a conceptual fusion pilot plant featuring a liquid first wall designed for a 40-year lifetime and compatible with high-repetition-rate operation. Together, these developments form a coherent pathway towards high-gain direct-drive targets and commercially relevant fusion energy systems. The talk will highlight the system-level considerations that motivate excimer technology, the target-design implications of higher available laser energy, and the engineering concessions required for a viable fusion power plant.

About the Speaker: Alison Christopherson is the Head of Target Design at Xcimer Energy Corp. where she leads the development of high-gain direct-drive targets for next-generation excimer-laser-driven inertial fusion energy systems. She earned her B.S. in Nuclear Engineering from the University of Michigan and her Ph.D. from the University of Rochester, specializing in direct-drive inertial confinement fusion. Her doctoral work advanced understanding of alpha particle heating and ignition, earning her the Rosenbluth Award for excellence in plasma physics. She went on to serve as a staff scientist in the Inertial Confinement Fusion program at Lawrence Livermore National Laboratory during the period when ignition was first achieved. Her experience at LLNL reinforced a key conclusion: solid-state laser architectures face fundamental scaling limits for the energy levels required to produce robust, high-gain targets and to accommodate the engineering concessions of a fusion power plant. Motivated by the promise of gas-optics-based excimer technology, she joined Xcimer to lead its target design program and shape the physics basis for the company's fusion roadmap.