
# Physics colloquium

## X-Ray Analysis Group Lead for Inertial Confinement Fusion

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**Abstract:** The National Ignition Facility (NIF) at the Lawrence Livermore National Laboratory (LLNL) is the world's largest and most energetic laser system. The 1.8 MJ of energy in NIF's 192 laser beams is designed to create very extreme states of matter - temperatures more than 100 million Kand pressures more than 200 billion atmospheres -conditions emulating those found in the interiors of stars and planets. One of the main NIF campaigns is focused on demonstrating thermonuclear burn in the laboratory by laser inertial fusion. Rapid progress is being made, with recent experiments demonstrating fuel gains -2 (two times more fusion energy generated than delivered to the fuel) and significant alpha heating. Work continues toward the goal of full ignition, and achieving this will be a major step towards demonstrating the feasibility of laser-based fusion as a source of abundant, carbon-free energy. We will provide an update on the progress and challenges toward controlled laboratory nuclear fusion.

**Bio:** Dr. Tammy Ma is an experimental plasma physicist in inertial confinement fusion (ICF) and high energy density physics at the National Ignition Facility (NIF) at the Lawrence Livermore National Laboratory (LLNL), in Livermore, California. She graduated from Caltech in 2005 with a B.S. in Aerospace Engineering, then received her M.S. in 2008 and Ph.D. in 2010 both from the University of California, San Diego. Tammy subsequently completed a postdoc at LLNL before transitioning to a staff scientist in 2012, where she now leads a number of the fusion experiments at the NIF and currently heads the X-Ray Analysis Group for the ICF program. She has authored or co-authored over 140 refereed journal publications and is strongly committed to education and scientific outreach. Tammy was recently awarded the Presidential Early Career Award for Science and Engineering (PECASE), the highest honor bestowed by the United States government on science and engineering professionals in the early stages of their independent research careers; as well as the 2016 Stix Award for Outstanding Early Career Contributions to Plasma Research from the DPP for her work in quantifying hydrodynamic instability mix in ICF implosions and for contributions to experiments demonstration fusion fuel gains exceeding unity; and is a 2018 recipient of the Department of Energy Early Career Award.