About the Cover:

Broad-bandwidth infrared light sources have the potential to revolutionize inertial confinement fusion by suppressing laser–plasma instabilities. There is, however, a trade-off: The broad bandwidth precludes high-efficiency conversion from the infrared to the ultraviolet, where laser–plasma interactions are weaker. Operation in the infrared could intensify the role of resonance absorption, an effect long suspected to be the shortcoming of early inertial confinement fusion experiments. The figure on the cover illustrates the resonance absorption of laser light in the presences of nonlinear, low-frequency density perturbations. Left: A monochromatic, *p*-polarized electromagnetic wave propagates up a density ramp. Near its turning point, the wave splits into a reflected and evanescent component and undergoes the electromagnetic decay instability. The instability creates a transverse ion-density perturbation that enhances the resonant excitation of an electron plasma wave at the critical surface by the evanescent field. As the plasma wave propagates down the density ramp, a wave–particle interaction converts the electrostatic energy to electron kinetic energy in the form of a superthermal tail in the electron distribution function, which can preheat the fusion fuel. Right: A broadband, *p*-polarized electromagnetic wave propagates up a density ramp. Each frequency component has a different turning point and undergoes the electromagnetic decay instability at a different location. This delocalization weakens the transverse ion-density perturbation and the excitation of each plasma wave. Instead of a single coherent plasma wave, a broad spectrum of much lower amplitude plasma waves are excited, which results in fewer superthermal electrons, but also less absorption.

In the photo on the right, J. P. Palastro is shown with a plot illustrating the density perturbation associated with the nonlinearly enhanced, resonantly excited electron plasma waves. The simulations used a new capability of the laser-plasma simulation environment (*LPSE*) that allows for the modeling of mixed electrostatic/magnetic modes. The new capability was developed by J. G. Shaw, R. K. Follett, and J. P. Palastro.

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