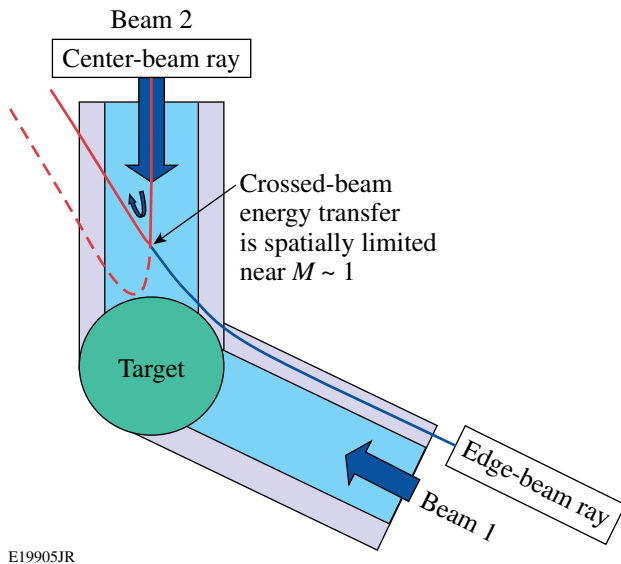


## About the Cover:

The cover photo highlights scientist Dr. Igor Igumenshchev presenting his results on the effects of crossed-beam energy transfer (CBET) in directly driven implosions. In the background is a schematic illustration detailing the physics and main equations underlying the CBET process. This process causes the transfer of energy from incoming laser light rays to outgoing rays and results in a reduction of laser coupling and hydrodynamic efficiency during the implosion. Simulations using the CBET model reproduce the reflected light and bang times of a variety of implosion experiments performed on OMEGA. Controlling the effects of CBET in direct-drive implosions is an important consideration for achieving ignition on the National Ignition Facility.



The figure on the left illustrates the CBET process. An incident ray (shown in blue) at the edge of Beam 1 is refracted outward from above the critical radius. As it proceeds away from the target, this ray interacts through a low-gain stimulated Brillouin scattering process with an incoming ray. This process peaks at the high-intensity center of Beam 2 (shown in red) resulting in the transfer of some Beam 2 energy to the outgoing ray. As a result, rays in the center of Beam 2 deliver less energy to the target, reducing the overall laser absorption.

This report was prepared as an account of work conducted by the Laboratory for Laser Energetics and sponsored by New York State Energy Research and Development Authority, the University of Rochester, the U.S. Department of Energy, and other agencies. Neither the above-named sponsors nor any of their employees makes any warranty, expressed or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, mark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring

by the United States Government or any agency thereof or any other sponsor. Results reported in the LLE Review should not be taken as necessarily final results as they represent active research. The views and opinions of authors expressed herein do not necessarily state or reflect those of any of the above sponsoring entities.

The work described in this volume includes current research at the Laboratory for Laser Energetics, which is supported by New York State Energy Research and Development Authority, the University of Rochester, the U.S. Department of Energy Office of Inertial Confinement Fusion under Cooperative Agreement No. DE-FC52-08NA28302, and other agencies.

Printed in the United States of America  
Available from  
National Technical Information Services  
U.S. Department of Commerce  
5285 Port Royal Road  
Springfield, VA 22161  
[www.ntis.gov](http://www.ntis.gov)

For questions or comments, contact Alex Shvydky, Editor  
Laboratory for Laser Energetics  
250 East River Road  
Rochester, NY 14623-1299  
(585) 275-9539  
[www.lle.rochester.edu](http://www.lle.rochester.edu)