THEORETICAL DIVISION
at Los Alamos National Laboratory

Research Highlights 2005

A Supplement to the Division Annual Self Assessment

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Preface

The Theoretical Division is an intellectual resource to Los Alamos National Laboratory and the nation, providing creative scientific and technological solutions to challenges in national security and related problems of national and global importance. The Laboratory's national security mission has an enduring need for science and technology beyond today's frontiers. The Theoretical Division responds to this need by striving to provide the best science and scientists to current LANL missions, and by pursuing frontier science to ensure excellence in science capabilities, creating new scientific directions, and attracting scientific leaders to LANL.

The Theoretical Division's capabilities are central to the Laboratory's Strategic Goals. Working with teams across the Laboratory, we undertake the major multidisciplinary challenge of integrating theory, modeling, simulation, and visualization with experimental and other data to provide cutting-edge, validated tools to interpret and guide experiments and expand predictive capability and uncertainty quantification to truly complex phenomena and systems. The core Nuclear Weapons Program—the centerpiece of the DOE Weapons Complex—depends critically on the viability of our approach. However, virtually every major initiative at LANL also relies heavily on this integrated capability: threat reduction and homeland security, manufacturing science, biology, nanoscience, quantum information, energy, infrastructure, and so on.

Each year, T-Division staff selects a collection of brief topical reports on their progress, as part of our self-assessment process. This collection is not intended to be complete. Rather it aims to demonstrate, through timely examples, the energy and progress across (and between) many disciplines in the Division in pursuit of our goal to serve the Laboratory and nation by furthering our fundamental understanding of, and predictive capabilities for, complex phenomena.

Alan R. Bishop
Division Leader

Paul J. Dotson
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