

# *Workshop on the science of Fusion ignition on NIF: Goals and Desired Output from Panels*

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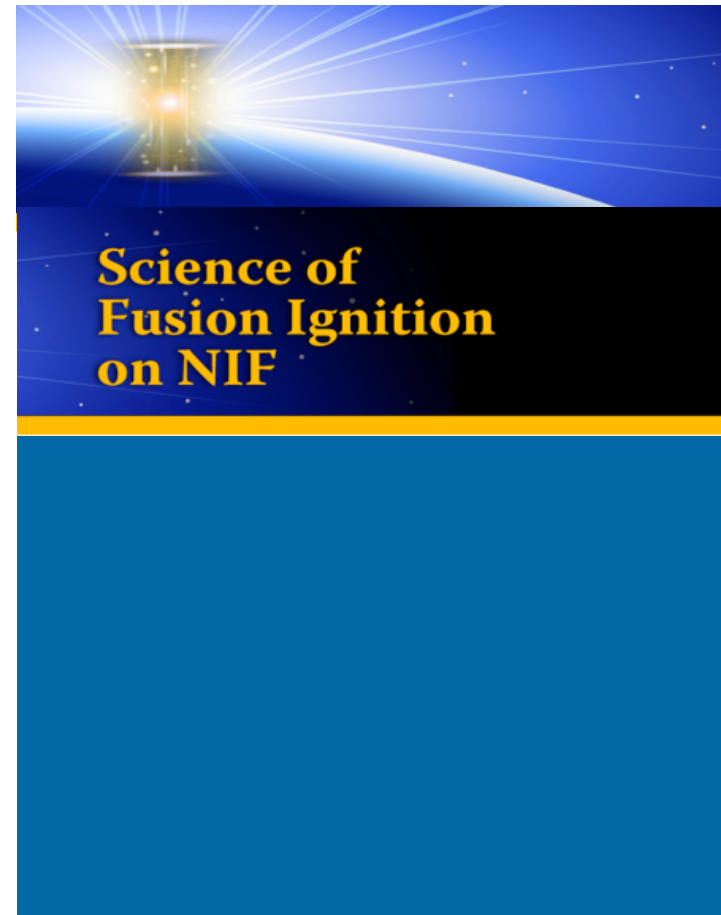


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# Workshop goals for Indirect Drive Fusion Ignition Science

- Identify the key physics that underlies indirect drive inertial fusion ignition;
- Review and summarize our understanding of this key physics, including new insights and questions raised by recent experimental results;
  - Assess what we know and how well we know it including key areas of disagreement between data and models
- Propose research directions that would address continuing gaps in understanding key physics
  - Identify likely model deficiencies and approaches to improving the models
  - Identify possible experiments using HED facilities that could expedite further understanding
- Assess the likely impact of each of these modeling or experimental areas in furthering progress in understanding ignition science



# Panel structure reflects elements of indirect drive ignition research

- Laser propagation and X-ray generation
- X-ray transport and ablation physics
- Implosion hydrodynamics
- Stagnation properties and burn
- HED Matter: opacity, EOS, etc.
- Integrated modeling

# The specific goal of each panel is to identify a set of research directions

- Define the physics (the problem)
- What do we know; what is uncertain? (where are we?)
- How do we address it (the path to better and more complete understanding)
- How will it make a difference for understanding, and the ability to design and field igniting and burning systems? (impact)

# Title of Panel

## Title of Priority Research Direction

### Underlying physics to be addressed

- Identify/describe the physics process or parameter
- What approximations or assumptions are made in representing it in simulations?

### Learned from Recent Experiments

- How do recent experimental results bear on our understanding of this physics, and how it is represented?

### Research Directions

- What can be done to address the challenge?
  - Theory
  - Code development
  - Experiments
  - Experimental platforms

### Outcome and Potential Impact

- What would be the impact of a better treatment or understanding of this physics, for the simulation capability, for understanding current results, and for moving the field forward

# Panel process

- Panel leads chair and facilitate
- Be respectful and constructive
- Everyone contributes
- Be brief and try to stick to the terms of reference
- Keep in mind the goals of the workshop
  - Identify underlying physics
  - Assess current state
  - Identify high impact future directions

# The product is a community report; each panel to produce

- Introduction (1 Paragraph)
- Status of the physics (1 page)
  - Underlying processes and properties
  - Status of theory and modeling
  - Impact of experimental results
- Opportunities for progress (1-2 pages)
  - What are the most important uncertainties and why
- Priority research direction 1 (2 pages)
  - Introduction
  - Near term improvements and approaches to theory and modeling
  - High impact experiments on HED facilities to address uncertainties in critical physics models
  - New capabilities (diagnostics, models) needed
  - Long term goals and outlook
- Priority research direction 2,3
- Conclusions (1 page)
- Two Side-bars (with figures)

# AGENDA

- **May 22, Evening**
  - **Registration and reception**
- **May 23**
  - **Breakfast (7-8)**
  - **Morning Plenary Session (8-12)**
    - **Workshop charter, structure and deliverables**
    - **NIC Status and review**
    - **Summaries of panel scope**
  - **Afternoon breakout (12-5)**
  - **Evening session (discretionary)**
- **May 24**
  - **Breakfast (7-8)**
  - **Morning plenary – initial report (8-9)**
  - **Morning breakout (9-12)**
  - **Afternoon breakout (1-3)**
  - **Afternoon plenary – final report (3-5)**
  - **Adjourn**
- **May 25**
  - **Optional NIF tour**



# First day plenary session

- 8:00 – Workshop Opening (Albright)
- 8:10 – NNSA Welcome (Quintenz)
- 8:20 – NIF Welcome (Moses)
- 8:30 – Workshop goals and deliverables (Goldstein)
- 8:45 – Ignition overview and status (Lindl)
- 9:45 – Ignition measurements (Kilkenny)
- 10:30 – Coffee Break
- 10:45 – Panel Introductions
- 11:45 – Lunch
- 12:00 – Breakout Sessions