NSAC Long Range Plan Process

Fundamental Symmetries, Neutrinos, and Neutrons

DNP Townhall

December 13, 2022

Gail Dodge

OLD DOMINION
UNIVERSITY

The Charge from DOE and NSF

- scope and scientific challenges of nuclear physics today
- Progress since the last LRP; impacts in and out of the field
- Most compelling scientific opportunities in next decade
- Strategy for use of existing and planned capabilities
- Required resources and funding levels to maintain world leadership position
  - New facilities, mid-scale instrumentation, major items of equipment (MIE)
  - Constant effort, modest growth, CHIPS act authorization
- International coordination and collaborations
- Cross cutting interdisplinary opportunities (interagency, etc)
- Mutually beneficial interactions with other disciplines
- Integrate efforts to promote a diverse, equitable, and sustainable workforce

LRP Writing Committee

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John Wilkerson
Richard Wilson
Lindley Winslow
Sherry Yennello
Xiaochao Zheng

12 served on 2015 LRP committee

The Long Range Plan Process

- Charge delivered to NSAC on July 13
- Committee formed
- DNP named conveners to organize three townhalls
  - QCD Sept. 23– 25 (MIT)
  - Nuclear Structure, Reactions, & Astrophysics Nov. 14 - 16 (Argonne)
  - Fundamental Symmetries Dec. 13 – 15 (Chapel Hill)
  - White papers will be produced
- Additional groups will also write white papers
- White papers due Feb. 28
- LRP Committee works on writing the bulk of the document
- Resolution Meeting July 10 – 14 in person
- Finish Report, executive summary, communication plan

One of the most important parts of this process is that the entire field is coming together in small and large groups to consider the physics and the future. This is very valuable!

Goals

- Answer the charge; recommend scientific priorities for the next 10 years
- Produce a readable report that
  - Summarizes the incredible science
  - Clearly articulates the impact (world leadership, interdisciplinary, HEP, applications, workforce, etc)
  - Helps agency leaders understand and make the case for investment in nuclear science
  - Informs congress (staffers)

We need to keep in mind the audience!

Subcommittees (Chairs)

- QCD (Richard Milner)
- Fundamental Symmetries (Brent VanDevender)
- Nuclear Structure, Reactions & Astrophysics (Ani Aprahamian)
- Workforce Development (Shelly Lesher)
  - includes education and DEI
- Applications (Calvin Howell and Mike Carpenter)
- International Context (Krishna Kumar)
- Crosscutting/interdisciplinary scientific opportunities (Ian Cloet)
  - QIS, AI/ML, Accelerator Science
- Impact and synergies with other fields (Jorge Piekarewicz)
- Budget (Sherry Yennello)
- Theory (Filomena Nunes)
- Facilities (Haiyan Gao)

Draft Outline for LPR report – work in progress

- Executive Summary
- The Story of Nuclear Physics
- QCD
- Nuclear Structure and Reactions
- Nuclear Astrophysics
- Fundamental Symmetries and Neutrinos
- Theory (overarching discussion relevant to all topics)
- Facilities
- Emerging Technologies (AI/ML, QIS, Accelerator Science, Detector Innovation)
- Applications (nuclear data, security, medicine, *etc.*)
- Workforce
- Budgets

We will have QR codes and links in the LRP that will lead to a permanently maintained site with additional content, videos, simulations, etc.

Disciplinary Chapters – Under Discussion

- Progress since last long range plan
- Key questions: why does this science matter? Why is it exciting?
- Emerging scientific opportunities
- International context/coordination/collaborations – should it be a sidebar?
- Refer to relevant facilities and other chapters as appropriate
- Sidebar: people/workforce
- 2 Sidebars: science topics
- Sidebar: impact on other fields/interdisciplinary example
- Sidebar: one application

Communication

- We will use APS Engage platform to announce meetings, provide updates, collect whitepapers and other input, and field general questions and comments.

Please join the APS Engage Community: NSAC Long Range Plan

- We will also have a regular web page site:
  - Password protected area for committee members
- Long term website that will be available after the LRP is finished.

What does the LRP Committee need from this townhall?

- Robust, inclusive community discussion
  - Science: progress, opportunities
  - Workforce, DEI
  - Interdisciplinary/Crosscutting/Impact/Applications
- Whitepaper
  - Summarize conclusions from townhall – resolutions, recommendations, etc.
  - Address aspects from the LRP charge (*e.g.,* international context)
  - Please consider an Executive Summary of modest length
    - Refer to additional text for more information
  - Reference whitepapers or other documents that served as input
  - Audience is the LRP committee
  - If the text is appropriate for the LRP document, that is an added bonus
- Sidebar/Ancillary Materials
  - Personal stories; videos; simulations

Ongoing

- Understand the budget
- Gather information
  - White papers
  - Statistics/Workforce
- Initiate task force on Communication/Rollout