On August 21-23 the Joint Town Meetings on Low Energy Nuclear Physics and Nuclear Astrophysics was held at the Mitchell Center on the campus of Texas A&M University. Participants met to discuss progress since the 2007 Long Range Plan, compelling science opportunities, needed capabilities to make further progress, and priorities for the next five to ten years. Approximately 270 individuals were in attendance, with additional material submitted by others who could not attend.

On 23 August the participants finalized the following sets of resolutions included below. Each town meeting had an individual set of resolutions and together generated a joint set of overall recommendations. Other than for possible grammatical corrections consent was reached on the final wording of these resolutions. There will be explanatory text for each of the resolutions that will provide further detail. This text will be posted as soon as possible and comment from all participants will be solicited. If you have comments or suggestions for this material please contact any of the Joint Town Meetings conveners.

Working group organizers will collect and submit edited written material for the Town Meeting White Papers. The Joint Town Meeting conveners will draft an executive summary and participants will have the opportunity to comment on this draft before it is finalized.

The following includes:

- Nuclear Astrophysics Town Meeting Resolutions
- Low Energy Nuclear Science Town Meeting Resolutions
- Joint Low Energy and Nuclear Astrophysics Meeting Resolutions

Resolutions from the Joint Low Energy and Nuclear Astrophysics Town Meetings

Nuclear Astrophysics Town Meeting Resolutions

1. FRIB's unprecedented intense beams of fast, stopped, and reaccelerated rare isotopes offer game changing opportunities for nuclear astrophysics, in particular in the areas of explosive nucleosynthesis and neutron stars.

- We strongly support the timely completion of the Facility for Rare Isotope Beams (FRIB) and the implementation of the full science program as the highest priority for the nuclear astrophysics community.
- To operate a broad nuclear astrophysics program we strongly recommend the development and implementation of critical equipment such as SECAR, GRETA, and the HRS for nuclear astrophysics measurements.

2. To address the compelling questions in nuclear astrophysics and to operate an effective and competitive nuclear astrophysics program a broad range of nuclear probes, techniques, and theory is essential. This requires appropriate utilization of the available nuclear physics facilities, in particular university-based laboratories, and strong theory support.

- We recommend to appropriately support operations and planned upgrades at ATLAS, NSCL, and university-based laboratories as well as the utilization of these and other facilities for enabling measurements with the broad range of beams required to achieve the science goals in nuclear astrophysics. It is essential that strong support for research groups is provided.
- We recommend strengthening support for nuclear theory and the founding of an FRIB theory center that addresses the needs of a broader nuclear astrophysics community. In addition we recommend focused multi-institutional research collaborations in theory and simulation to take advantage of new opportunities created by increased computing capabilities and large data science.

3. High intensity underground accelerator measurements have emerged as a critical tool for directly studying reactions in stellar burning that govern stellar evolution and provide the seeds for explosive nucleosynthesis.

- We recommend the construction and operation of a high intensity underground accelerator facility for the study of stable beam reactions near quiescent stellar burning conditions.

4. Interdisciplinary centers are important for advances in nuclear astrophysics as they overcome field boundaries between nuclear physics and astronomy, and bring together the diverse experiment, theory, and observation communities that comprise the field of nuclear astrophysics.
Data compilation, dissemination, and distribution is an essential component for such interdisciplinary efforts.

- We recommend the continued support for the operation of the Joint Institute for Nuclear Astrophysics as Physics Frontiers Center and other field bridging initiatives.
- We recommend continued robust support of the operation of data centers and other data compilation efforts of importance for nuclear astrophysics.

5. Education and innovation are key components of any vision of the future of the field of nuclear science.

- We fully endorse the recommendations of the Education and Innovation White Paper.

Low Energy Nuclear Science Town Meeting Resolutions

The town meeting culminated in the formulation of the following statement of recommendations for the LRP planning committee:

1. The study of atomic nuclei is the core of nuclear science. The frontier of this field lies in the new opportunities and intellectual challenges offered by FRIB's ability to produce intense beams of rare isotopes. This ability will lead to an unprecedented understanding of nuclei, of their role in the cosmos, and studies of fundamental interactions. The field is ideally positioned, as well, to advance applications in medicine, energy, national security, and materials science. The health of this field is required to train the talented national workforce needed to assure continuing societal benefits in these critical areas. FRIB provides an essential and unparalleled opportunity to pursue compelling science and maintain world leadership in this field.

- We reaffirm in the strongest possible terms the scientific vision of FRIB and endorse the recommendation laid out in the 2012 National Academy Decadal Study for the timely completion of this advanced rare ion beam facility and the initiation of its full scientific program. Once completed, FRIB will be the world-leading nuclear physics facility that enables tremendous discovery potential for the physics of nuclei, nuclear astrophysics, and the study of fundamental symmetries, with the added benefit of significant applications potential in many areas of societal importance.

Recommendation of the National Research Council Decadal Study, 2012
Finding: The Facility for Rare Isotope Beams is a major new strategic investment in nuclear science. It will have unique capabilities and offers opportunities to answer fundamental questions about the inner workings of the atomic nucleus, the formation of the elements in our universe, and the evolution of the cosmos.
Recommendation: The Department of Energy's Office of Science, in conjunction with the State of Michigan and Michigan State University, should work toward the timely completion of the Facility for Rare Isotope Beams and the initiation of its physics program.

2. In support of our science goals, we must continue forefront research to enable new discoveries, to train the next generation of scientists, and to develop new detector and accelerator technologies. Hence:

- We recommend that appropriate funds for operations and near-term upgrades of existing research capabilities at ATLAS, NSCL, university and other facilities be provided. Improvements and developments of instrumentation at existing facilities should be adequately supported. It is essential that strong support for research groups is provided.

- We recommend that enhanced support for nuclear theory be provided to address key questions in nuclear physics and astrophysics and to realize the full potential of the experimental program at FRIB. We recommend the creation of a national FRIB theory center to drive this exciting science and the computational nuclear physics initiative to take maximum advantage of high performance computing critical to this effort.
- To realize the full scientific discovery potential of FRIB and existing facilities, it is essential that major experimental systems are available. We recommend:

    - the construction of the 4π GRETA in a timely manner.
    - the timely construction of other new state-of-the-art instruments for FRIB, such as the High Rigidity Spectrometer and the separator for capture reactions SECAR.
    - the construction of ReA12 in a timely manner.

3. We endorse the recommendation of the 2014 Computational Nuclear Physics Meeting: "Capitalizing on the pre-exascale systems of 2017 and beyond requires significant new investments in people, advanced software, and complementary capacity computing directed toward nuclear theory."

4. Education and innovation are key components of any vision of the future of the field of nuclear science. We therefore fully endorse the recommendations of the Education and Innovation Town Meeting.

Joint Resolutions: LENP and NAP Town Meetings

The Low Energy Nuclear Physics and Nuclear Astrophysics town meetings culminated in the formulation of the following joint statement of recommendations for the LRP planning committee:

Science and society rely on our understanding of the atomic nucleus. Its relevance spans the dimensions of distance from 10^{-15} m (proton's radius) to 12 km (neutron star radius) and timescales from fractions of a second after the Big Bang to today; i.e., 13.8 billion years later. As reaffirmed by the 2012 National Academies of Sciences' decadal study "*Nuclear Physics: Exploring the Heart of Matter*," the path to understanding the nucleus requires the completion of the Facility for Rare Isotope Beams (FRIB) and its effective operation. Unprecedented access to a vast new terrain of nuclei will result in scientific breakthroughs and major advances in our understanding of nuclei and their role in the cosmos, and will open new avenues in cross-discipline contributions in basic sciences, national security, and other societal applications.

- ***The highest priority in low-energy nuclear physics and nuclear astrophysics is the timely completion of the Facility for Rare Isotope Beams and the initiation of its full science program.***

In support of our science goals we must continue forefront research, exploit existing facilities, develop new capabilities and equipment, and enable major advances in nuclear theory.

- ***We recommend appropriate support for operations and planned upgrades at ATLAS, NSCL, and university-based laboratories, as well as for the utilization of these and other facilities, for continued scientific leadership. Strong support for research groups is essential.***
- ***We recommend enhanced support for theory in low-energy nuclear science and nuclear astrophysics, which is critical to realize the full scientific promise of our fields.***
- ***We recommend targeted major instrumentation and accelerator investments to realize the discovery potential of our fields.***

Realizing the scientific potential of Low Energy Nuclear Physics and Nuclear Astrophysics demands large-scale computations in nuclear theory that exploit the US leadership in high-performance computing.

- ***We endorse the recommendation of the 2014 Computational Nuclear Physics Meeting: "Capitalizing on the pre-exascale systems of 2017 and beyond requires significant new investments in people, advanced software, and complementary capacity computing directed toward nuclear theory."***

Education, outreach, and innovation are key components of any vision of the future of the field of nuclear science. Our fields play a leading role in education and training of the nation's nuclear science workforce. Our fields are ideally positioned, as well, to advance applications in medicine, energy, national security, and materials science. The health of this field is required to train the talented national workforce needed to assure continuing societal benefits in these critical areas. Continuation of this role is a major goal of our fields.

- ***We endorse the recommendations of DNP Education and Innovation Town Meeting.***