



## Fundamental Physics Program

NASA's Biological and Physical Sciences Division of the Science Mission Directorate will soon solicit applications for a highly motivated individual to provide scientific leadership in pioneering scientific discovery and enabling exploration in its Fundamental Physics program, which focuses on the development of research using the space environment to advance knowledge and applications of quantum science and other fields of physics.

### Our Mission

The NASA Fundamental Physics program identifies and develops concepts for transformative applications of the space environment to advance the boundaries of experimental physics. Since at least the early 1950's, physicists have been giving thought to experiments uniquely possible in space. Most of these experiments have used the free-falling environment of Earth-orbiting vehicles to conduct experiments under nearly gravity-free conditions, but more recently concepts have emerged that use the vacuum of space to send entangled photons over long distances.

In the primary focus of the current program, quantum phenomena with ultracold atoms, the near absence of gravity allows atom clouds to be positioned with minimal applied forces, allowing (in principle) for colder atoms, larger atomic de Broglie wavelengths, and potentially stronger, cleaner, and more scientifically interesting interactions than is possible using equivalent Earth-based atom traps. Space-based experiments also offer the possibility of longer observation times than is possible on Earth, a huge advantage in experiments involving atom interferometry, where experimental accuracy scales with the square of the observation time. The Cold Atom Laboratory aboard the International Space Station (ISS) currently supports an active research program in ultracold atomic matter. We are working closely with the German Space Agency, DLR, to develop a follow-on instrument expected to be available in 2025-26.

Other research areas in development in fundamental physics include clock-based tests of general relativity, entangled photon experiments probing the relationship between quantum mechanics and general relativity, and an active program of research in the behavior of dusty plasmas, in which NASA participates in a multinational project aboard the ISS. Future development of these research areas is likely to involve mission-specific satellites, experiments on the lunar surface, and Earth-orbiting platforms.

### For More Information

For more information, visit:

[nasa.gov/sites/default/files/atoms/files/np-2015-04-021-jsc\\_fundamental\\_physics-iss-mini-book-508.pdf](https://nasa.gov/sites/default/files/atoms/files/np-2015-04-021-jsc_fundamental_physics-iss-mini-book-508.pdf)

### About the Position

The Fundamental Physics Program Scientist provides expert scientific leadership for the formulation and execution of all aspects of the Fundamental Physics program and represents this program to external organizations. Responsibilities include:

- Maintaining the scientific integrity of the program.
- Working with the Physical Sciences Program Manager to establish and set the organizational strategic direction, goals, priorities, structure, processes and culture for Fundamental Physics.
- Leading the development and maintenance of research and technology plan(s).
- Leading the formulation and execution of solicitations for research and technology development in fulfillment of the program's plans and making selection recommendations.
- Monitoring progress of the research and technology development portfolio.
- Providing authoritative and comprehensive advice, assistance and oversight to NASA Centers and program and project offices to ensure the program is implemented at the NASA Centers in an integrated manner.
- Advocating for Fundamental Physics science and developing collaborations with external organizations. Participating in domestic and international scientific conferences and symposia as the senior program science representative.

### Qualifications

Candidates for this GS-15 position should have demonstrated subject matter understanding and, ideally, experience through one (or more) of the following:

- A manager of a government research program that solicits and awards grants through a peer-reviewed, competitive solicitation process
- A Principal Investigator leading an academic or government research group with funding won through peer-reviewed, competitive solicitations
- A NASA Project Scientist or Mission Scientist facilitating the success of Principal Investigator-led investigations

U.S. Citizenship is required.

### Position Location

The duty station will be determined upon selection and will be at one of the following locations: NASA Headquarters (Washington, DC) - preferred; Glenn Research Center (Cleveland, Ohio); or Marshall Space Flight Center (Huntsville, Alabama).

### How to Apply

This position is a permanent civil service assignment and will be posted on USAJobs.gov in April 2021.