



# PHYSICS OF THE COSMOS

How does the universe work?







NASA's Physics of the Cosmos theme is focused on understanding, **"How does the universe work?"** The elements of the image on the front of this poster are intended to artistically evoke the great questions embedded in that simple query, including:

What astrophysical events and fundamental processes give rise to the strains that gravitational waves imprint on spacetime?

Is Einstein's General Theory of Relativity sufficient to explain gravity on the largest scales of mass and distance?

What is the interplay between supermassive black holes and galaxies as they form and evolve?

How do matter and energy behave under the most extreme physical conditions in the universe, from the event horizons of black holes to the interiors of neutron stars and the high-speed outflows from stellar explosions and accretion disks?

What are the cosmological parameters governing inflation and driving the universe's expansion and large-scale evolution?

What physical properties and underlying mechanisms define dark matter and dark energy, the dominant but still mysterious components that account for about 95% of the energy content of the universe?

To address these questions, the Physics of the Cosmos (PhysCOS) Program Office within NASA's Astrophysics Division supports the development of missions spanning the fields of high-energy astrophysics, multimessenger astrophysics, cosmology, and fundamental physics. We collaborate with the global astrophysics community, through the PhysCOS Program Analysis Group (PhysPAG), to identify the mission concepts and technological advancements needed to address these fundamental questions. We facilitate community engagement at major conferences and through regular virtual meetings. Along with our sibling program offices, Cosmic Origins and Exoplanet Exploration, we manage NASA's strategic technology development investments.



For more information or to get involved in PhysCOS community activities  
<https://science.nasa.gov/astrophysics/programs/physics-of-the-cosmos/>