

Revealing dark energy's hold on the Universe: What a new collaboration hopes to uncover

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The race is on to solve the mystery of dark energy, the unknown force that is causing the universe to expand faster and faster. It's one of the biggest open questions in cosmology, but now a handful of high-profile projects are paving the way toward discovery.

A project called ACTPol in Chile, and another called SuMIRe in Hawaii, are launching massive observation campaigns that will image and map the positions of galaxies over billions of years of [cosmic history](#). This new picture will allow astronomers to study how [dark energy](#) has influenced the evolution of the universe. It may also help answer a question that confounds scientists today: why did dark energy kick in about 7 billion years ago, taking over the fate of the universe by causing the accelerated expansion we see today?

The Kavli Foundation recently held a roundtable discussion with three key researchers associated with two new and collaborating dark [energy projects](#): ACTPol, which stands for Atacama Cosmology Telescope—Polarization" and SuMIRe, or "Subaru Measurement of Images and Redshifts."

"Together, we can build a big picture for how fast [galaxy clusters](#) grew at different points in cosmic history," says David Spergel, a [theoretical astrophysicist](#) and professor at Princeton University and a leader of the ACTPol team. "And that will tell us how fast the universe was expanding at different points in time—whether it changed and how it changed."

Says Masahiro Takada, a professor at the Kavli Institute for the Physics and Mathematics of the universe (Kavli IPMU) and a leading team member of SuMIRe: "Mapping galaxies and galaxy clusters

throughout history tells us about the two dominant competing forces in the universe: the [gravitational force](#) of [dark matter](#), which drives the growth of galaxies and galaxy clusters, and dark energy, which causes the universe to expand and pull everything apart. ... So, mapping [cosmic structure](#) over time tells us the story about this ongoing competition between dark matter and dark energy."

Michael Niemack, an assistant professor of physics at Cornell University and a leading team member of the ACTPol team, says: "We have the potential to understand cosmology from the most minute scales of particle physics, such as what dark matter might be made of, all the way to the grandest scales where dark energy is dominating the expansion today."

On Aug. 22, from 12 noon to 12:30 p.m. PDT (19:00-19:30 UTC), The Kavli Foundation will host a live webcast on dark energy, featuring Michael Niemack as well as two researchers with the Dark Energy Survey: Joshua Frieman and Marcelle Soares-Santos. The three scientists will answer questions from the public during the live Google Hangout.

More information:

www.kavlifoundation.org/scienc...energy-hold-universe

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