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Hawaii scientist maps and names Laniakea, our home supercluster of galaxies

University of Hawai‘i at Mānoa

Contact: [R. Brent Tully, \(808\) 956-8606](mailto:R.Brent.Tully@ifa.hawaii.edu)

Astronomer, Institute for Astronomy

[Talia Ogliore, \(808\) 956-4531](mailto:Talia.Ogliore@ifa.hawaii.edu)

Public Information Officer, Vice Chancellor for Research

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University of Hawai‘i at Mānoa astronomer R. Brent Tully, who recently shared the 2014 Gruber Cosmology Prize and the 2014 Victor Ambartsumian International Prize, has led an international team of astronomers in defining the contours of the immense supercluster of galaxies containing our own Milky Way. They have named the supercluster “Laniakea,” meaning “immense heaven” in Hawaiian. The paper explaining this work is the cover story of the September 4 issue of the prestigious journal *Nature*.

Galaxies are not distributed randomly throughout the universe. Instead, they are found in groups, like our own Local Group, that contain dozens of galaxies, and in massive clusters containing hundreds of galaxies, all interconnected in a web of filaments in which galaxies are strung like pearls. Where these filaments intersect, we find huge structures, called “superclusters.” These structures are interconnected, but they have poorly defined boundaries.

The researchers are proposing a new way to evaluate these large-scale structures by examining their impact on the motions of galaxies. A galaxy between two such structures will be caught in a gravitational tug-of-war in which the balance of the gravitational forces from the surrounding large-scale structures determines the galaxy’s motion. By mapping the velocities of galaxies throughout our local universe, the team was able to define the region of space where each supercluster dominates.

The Milky Way resides in the outskirts of one such supercluster, whose extent has for the first time been carefully mapped using these new techniques. This Laniakea Supercluster is 500 million light-years in diameter and contains the mass of 10^{17} (a hundred quadrillion) suns in 100,000 galaxies.

This study clarifies the role of the Great Attractor, a problem that has kept astronomers busy for 30 years. Within the volume of the Laniakea Supercluster, motions are directed inwards, as water streams follow descending paths toward a valley. The Great Attractor region is a large flat bottom gravitational valley with a sphere of attraction that extends across the Laniakea Supercluster.

The name Laniakea was suggested by Nawa‘a Napoleon, an associate professor of Hawaiian Language and chair of the Department of Languages, Linguistics, and Literature at Kapi‘olani Community College, a part of the University of Hawai‘i system.

The name honors Polynesian navigators who used knowledge of the heavens to voyage across the immensity of the Pacific Ocean.

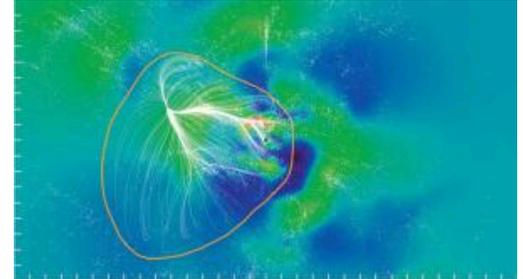
The other authors are H el ene Courtois (University Claude Bernard Lyon 1, Lyon, France), Yehuda Hoffman (Racah Institute of Physics, Hebrew University, Jerusalem), and Daniel Pomar ede (Institute of Research on Fundamental Laws of the Universe, CEA/Saclay, France).

A short video about Laniakea that gives the viewer a general sense of the structure of our home supercluster and of galaxy motions in the nearby universe is available at <http://vimeo.com/104704518>. A longer video that complements the *Nature* paper may be found at <http://irfu.cea.fr/laniakea>.

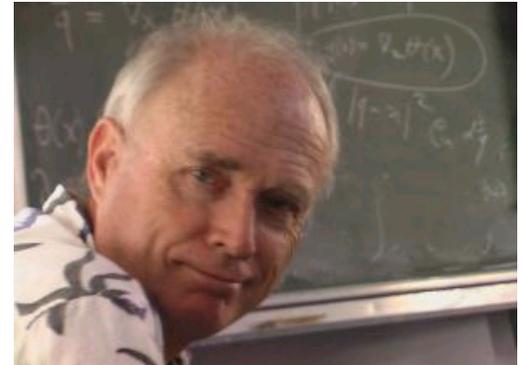
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About the Institute for Astronomy (<http://www.ifa.hawaii.edu/>)

Founded in 1967, the Institute for Astronomy at the University of Hawai‘i at Mānoa conducts research into galaxies, cosmology, stars, planets, and the sun. Its faculty and staff are also involved in astronomy education, deep space missions,



A slice of the Laniakea Supercluster in the supergalactic equatorial plane.



R. Brent Tully. Photo credit: Igor Karachentsev.

and in the development and management of the observatories on Haleakala and Maunakea. The Institute operates facilities on the islands of Oahu, Maui, and Hawaii.

For more information, visit: <http://www.ifa.hawaii.edu/info/press-releases/Laniakea/>

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