Our Team

Krzysztof Gorski

Research Field: Cosmology and Astrophysics

Kavli IPMU Professor

I am visiting Kavli IPMU on leave from Caltech/JPL in Pasadena, where I am a Senior Research Scientist since 2003, and where I am working in the ESA/NASA Planck mission collaboration. Most of my career was focused on studies of the cosmic microwave background (CMB) radiation. After I completed my education in Poland, I came to Berkeley to work with Joseph Silk, and Marc Davis on cosmology and large scale structure in the universe. Afterwards I joined the COBE team and NASA/Goddard Space Flight Center to work on the characterization of the pioneering measurements of the CMB anisotropy.

Since then I continued to develop the analysis and science extraction methods for CMB applications. Amongst those, the one that I originally created and that became very broadly used is HEALPix (http://healpix.sourceforge.net), a method for efficient discretization and analysis of data distributed on the sphere.

I took part in a wide array of science projects that were spawned by acquisition of the remarkable Planck data set, including (1) the studies of temperature and polarization of foreground emission and its separation, (2) assessments of statistics of the primordial CMB fluctuations, (3) and isotropy of the universe, (4) as well as estimation of the CMB anisotropy spectrum and its parametrization, which became a pinnacle of modern cosmology.

Now, that Planck project is nearing its completion, we are looking forward to new avenues for pushing ahead with CMB measurements. LiteBIRD satellite mission proposed to JAXA is one of such exciting prospects for delivering space based measurements of CMB polarization of sufficiently high fidelity to reveal the coveted background of primordial gravity waves leftover from the inflationary inception of our universe.

I am visiting Kavli IPMU to interact with the Japanese team of LiteBIRD to share our Planck experience with space exploration of the CMB, and to establish prospects for the future collaboration.

Ryu Makiya

Research Area: Astronomy

Postdoc

My research interests lie in observational cosmology and cosmological galaxy formation. I have developed a phenomenological model of cosmological galaxy formation in order to gain insights into the physics of galaxy formation through observation.

I am also interested in the accelerated expansion of the universe. In the Kavli IPMU, I will tackle this greatest mystery in the Universe by using the theoretical galaxy formation model and various observational data sets, including the 3D galaxy map which will be obtained by the Subaru PFS.

Yuki Sakurai

Research Area: Experimental Physics

Postdoc

I am working on a Cosmic Microwave Background (CMB) polarization observation satellite, LiteBIRD mission. With LiteBIRD it is possible to perform a verification of typical inflation models, searching for primordial gravitational waves generated in the early universe through all-sky observation of CMB polarization. The mission is now in the stage of feasibility verification and detector development, aiming to launch in the 2020s. My research focuses on the development of optical system which leads CMB to focal plane detectors. I am challenging an observation of ultrahigh energy physics of the early universe, using my background in particle physics.

Tea Break:

Mathematicians Joke about Themselves

Two physicists are lost riding in a hot air balloon. They spot a man on the ground and shout: "Where are we?" The man on the ground thinks for a few long minutes and then yells back: "You are in a balloon!" The physicists in the balloon are stunned by the unexpected answer. One physicist says to the other, "Just our luck to run into a mathematician." "How do you know he is a mathematician?" asks the other. "Well, first of all, the man took a long time to figure out the answer. Second, his answer was absolutely precise. And third, it was totally useless!"

(Contributed by Alexander A. Voronov)