

Division of Physical Cosmology

- Newly established in August, 2012
 - Directed by Eiichiro Komatsu



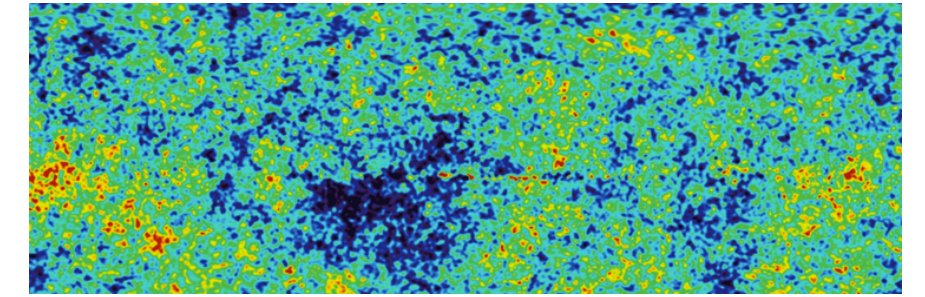
Four Big Questions in Cosmology

- Members of the Physical Cosmology Division seek answers to **FOUR** big questions in cosmology:
 - How did the Universe begin?
[What is the physics of inflation?]
 - What is the origin of the cosmic acceleration?
[What is the nature of dark energy?]
 - What is the nature of dark matter?
 - What is the mass of neutrinos?

We use both **theory** and **observational data** to seek answers to these major questions.

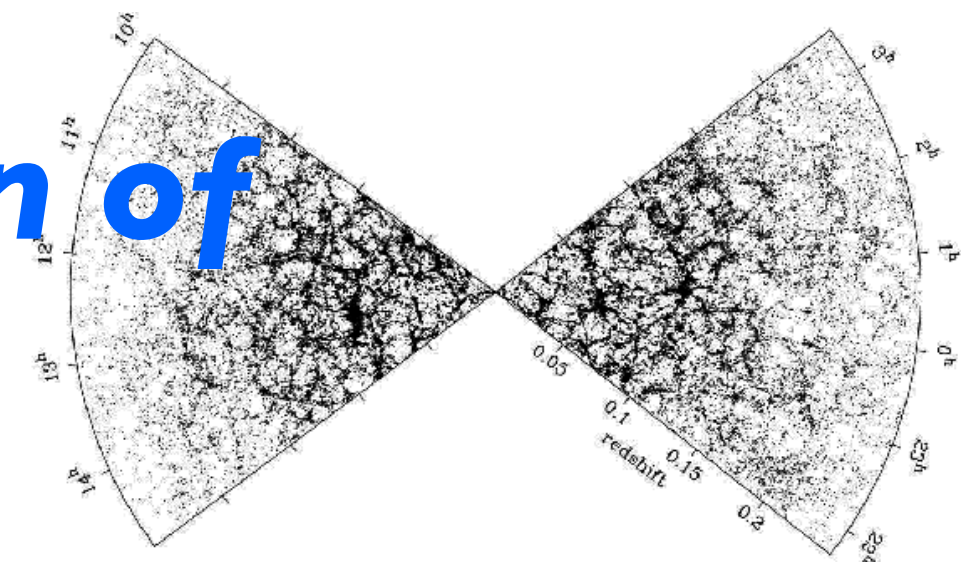
Main Tools

- **Cosmic Microwave Background (CMB)**



- Fossil light of the Big Bang
- Excellent probe of the early universe: **Inflation**

- **Large-scale structure (LSS): distribution of galaxies and galaxy clusters**



- Probing the late-time universe: **dark energy** and **mass of neutrinos**

- **Gravitational lensing**

- Distribution of **dark matter**



Possible Thesis Projects

- Students will mainly be involved in data-oriented projects:

CMB

- The new CMB data from the **Planck** satellite will keep us busy for the next several years.



- Analyze the Planck data to learn about the physics of inflation and/or astrophysics of clusters of galaxies



SST

- Komatsu is involved in a new galaxy survey project called “Hobby-Eberly Telescope Dark Energy Experiment” (**HETDEX**), which begins in 2014
- Analyze the HETDEX data to learn about dark energy and the neutrino mass!

