

The First Big Step for the Hyper Suprime-Cam Project!

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Finally the Hyper Suprime-Cam (HSC) had its first big step! During the first commissioning run starting from Aug 16 2012, the HSC was mounted on the 8.2m Subaru Telescope, and then it was confirmed that the HSC camera properly captured lights from the star Vega. It was the exciting moment that the HSC project finally became a reality. Since the initial concept emerged back in 2002, led by Dr. Satoshi Miyazaki (NAOJ, Principal Investigator of the HSC Survey), many scientists and researchers across various institutes in Japan and from Taiwan and Princeton University have joined subsequently and collaborated together, and then finally the first commissioning run was carried out – about 10 years instrumentation/development of the HSC project.*1

HSC is the new-generation prime-focus camera of the Subaru telescope that is designed to have a 1.5-degree field-of-view*2 in diameter, substantially wider than the current camera (Suprime-Cam) by a factor of 7, but to maintain excellent image quality. HSC is a “huge” digital camera, standing 3 meters high, weighing 3 tons, and having 116 CCD chips mounted at the focal plane, 870 millions pixels in total. To study the evolution history of the Universe and its fate, we astronomers need a homogenous survey measuring as deep, distant (therefore fainter) galaxies as possible over as a wider solid angle on the sky as possible. Thanks to its large mirror aperture, wide field-of-view, and excellent image quality, the HSC becomes the most powerful survey imaging camera in the world.*3

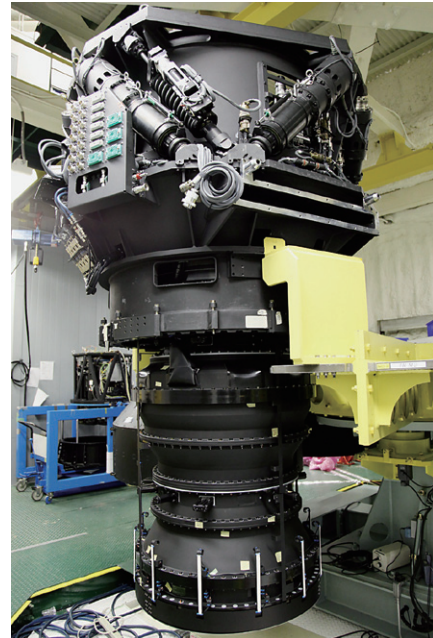
The HSC team has now grown up consisting of

*1 I have been involved in the HSC project since I joined the Grants-in-Aid for Scientific Research for the HSC project back in 2006.

*2 The field-of-view (FoV) is the area on the sky which a camera can see at once.

*3 The HSC FoV has roughly the same area as a total area of 7 full moons.

*4 Etendue, the FoV times the mirror size, is often used to quantify a survey speed of a given camera. In terms of Etendue, HSC is the most powerful camera in the world, more powerful than the Dark Energy Camera (DECam) used for the competing survey in the US, Dark Energy Survey (DES), by about factor of 3.



Entire view of HSC (Credit: NAOJ HSC Project).

about 160 people from various places, mainly Japan, Taiwan, and Princeton University. We have worked together in preparation for carrying out a largest-ever galaxy survey with HSC. We are planning to picture detailed, high-quality images for several hundred millions of galaxies, among hundreds of billions of galaxies that exist in the Universe. That is, the HSC survey offers a population sensor of the Universe. In particular, we are planning to make, from the HSC data, a high-precision measurement of gravitational lensing effects, predictions of Einstein’s gravity theory, in order to reveal the distribution of dark matter in the Universe. Further, by measuring how dark matter “clusters” as a function of time in an expanding universe, we hope to constrain the nature of dark energy that is the unknown, mysterious component to govern the fate of the Universe behind the scenes. We plan to start the HSC survey from the middle of 2013, for 5 years duration. The aforementioned “first-move” of the HSC camera just marks “the start line” of our extraordinary long-journey, the HSC survey, and from now is the real journey we should make. Please stay tuned for exciting science news we will soon bring with the HSC survey!