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## Preface

In our quest to elucidate the origin of the universe and the formation of galaxies, particularly that of the Milky Way in which we live, astounding progress has been made in recent years through observational and theoretical studies. Not only have gigantic surveys covering a large fraction of the sky brought statistics enlightening evolutionary paths of galaxies, but powerful instruments, such as radio interferometers and ground- and space-based optical/infrared telescopes, have been able to map individual objects with high sensitivity and spatial resolution. Yet we do not fully understand the physics behind the observational results, and a number of unsolved problems need to be discussed, such as: What is the origin of disks and spheroids and which form first? What determines the global star formation rate in galaxies? How influential are the environment and interactions for nearby galaxies? What causes starburst and AGN activity in galaxies?

In order to discuss and make progress on these important questions, aided by recent observational and theoretical work, we organized a symposium entitled “Mapping the Galaxy and Nearby Galaxies”, on 26 June - 30 June, 2006, at Ishigaki island. Ishigaki is a tropical resort island located about 1000 km south-west from the main island of Japan and surrounded by a coral reef and beautiful white sand beaches. Ishigaki is also the site of one of the 20 m radio telescopes in the VLBI Exploration of Radio Astrometry (VERA) network, which is operated by National Astronomical Observatory of Japan.

The symposium was also planned in celebration of Professor Yoshiaki Sofue’s 63rd birthday and his retirement from the University of Tokyo. Although Prof. Sofue has worked mainly in the domain of radio astronomy, he has been active over the past four decades in a large number of different fields in galactic and extra-galactic astronomy. The wide range of topics discussed in this symposium were all related to some of his numerous works.

After very long flights (even for most Japanese attendees!), and a friendly welcome at the airport from the local authorities, a total of 160 people participated to the symposium, about half from outside Japan. During the week, 24 invited talks, 28 contributed talks, and 94 poster papers were presented in

four sessions: (1) Basic Components of the Galaxy and Spiral Galaxies, (2) The Galactic Center and Central Region of Galaxies, (3) Nearby Galaxies, and (4) Galactic Evolution and Environment.

In Session I, the discussion focused on results on stellar and interstellar matter in spiral galaxies from recent observational surveys at optical through radio wavelengths, such as those carried out with NANTEN, Spitzer, or maser techniques. Theoretical studies on the evolution of barred spiral galaxies and the Milky Way halo were also presented. The structure of galactic magnetic fields was discussed from both an observational point of view and that of three-dimensional magneto-hydrodynamic simulations.

In Session II, observational results were presented on the central region of our Galaxy and active galactic nuclei from the X-ray satellite SUZAKU, as well as from optical, infrared, and radio studies. CO line surveys of nearby spiral galaxies obtained by NMA, the NRO45 m, the IRAM30m and the IRAM interferometer were discussed, along with 3D kinematics of the central parts of nearby spiral galaxies. Initial results of ASTE were also presented in talks and poster papers. The strong influence of barred potentials on the gas dynamics was discussed from a theoretical point of view.

Session III continued with invited talks and contributions on observational studies of nearby galaxies, or the outer part of spiral galaxies and extra-galactic magnetic field.

Galactic evolution and environment were discussed in Session IV. Environmental effects in clusters of galaxies and local groups, results from the COSMOS survey, and observations of rotation curves in  $z \sim 2$  spiral galaxies from the VLT were presented, as well as recent theoretical studies on the co-evolution of supermassive black holes and bulges.

During a free afternoon, participants visited the VERA observatory and took a tour of the 20 m telescope with its unique dual-beam system. In the observatory, the 4D2U (Four-dimensional Digital Universe) project of NAOJ presented 3-D movies of numerical simulations and a virtual trip from the solar system to the horizon of the universe. Astronomers also enjoyed beautiful tropical beaches and another “universe” with colorful fish and many kinds of coral from glass-bottom boats, at the emerald blue Kabira bay. They had also the opportunity to visit the nearby island Taketomi, and some of them made a complete bicycle tour of the island, famous for its ancient typical houses decorated with “Seasers” (talismanic lions).

The conference banquet close to the sea was the climax of the meeting. After a beautiful sunset tinted the beach, participants enjoyed local cuisine and magnificent performances of traditional dancing and music by students of Yaeyama Shoko High School.

In the next decade, further progress will be possible with new-generation instruments, such as ALMA, JWST, ELTs, Herschel, SPICA, and SKA. With these telescopes, complete multi-wavelength data at high resolution will become available on structures in our Galaxy, nearby galaxies and the more distant universe. The present symposium was a good opportunity to have a

comprehensive discussion on what has been learned so far, what are the major outstanding problems, and how we can physically tackle them. We were impressed by recent progress in numerical modeling of galaxies, which will be an essential tool in understanding and testing physical interpretations of “mapping observations” at high resolution.

We wish to express our thanks to the members of the scientific organizing committee for their valuable advice. On behalf of the SOC, we would like to thank Mareki Honma and his team for their collaborative and assiduous effort for almost two years to organize this successful symposium. We are also grateful to Ishigaki City and NPO Yaeyama Hoshino-kai (Star Watching Club) for their warm hospitality and help in various aspects not only during the conference but also in the phases of preparation. We also thank the 4D2U project (Eiichiro Kokubo, Takaaki Takeda, and Sorahiko Nukatani) for their impressive demonstration in VERA observatory. We should also thank Shioko Izumi, Toshiko Tachibana, Tomoka Tosakaki, Haruhiko Takahashi, Takeshi Hashiguchi, and Mayumi Handa for the help they provided to the LOC.

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Keiichi Wada (*National Astronomical Observatory of Japan*)  
and Françoise Combes (*Observatoire de Paris*)





Prof. Yoshiaki Sofue, Hiromi Sofue, and Françoise Combes



Yoshiaki Sofue, Mareki Honma, Masaki Morimoto, Naomasa Nakai, Keiichi Wada, Nick Scoville, Nagateru Ohama (City Mayor), Françoise Combes, Reinhard Genzel

## The Organizing Committee

### Scientific

Keiichi **Wada** (NAOJ, Chair)  
 Nobuo **Arimoto** (NAOJ)  
 Françoise **Combes** (Paris observatory, France)  
 Reinhard **Genzel** (MPE, Germany)  
 Naomasa **Nakai** (Tsukuba, Japan)  
 Nick **Scoville** (Caltech, USA)  
 Masato **Tsuboi** (Nobeyama, NAOJ, Japan)

### Local

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 Takayuki **Saitoh** (NAOJ)  
 Sachiko **Onodera** (University of Tokyo)

NAOJ: National Astronomical Observatory of Japan



Reinhard Genzel gives a speech for a warm welcome by Ishigaki-City at the airport.

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