June 4, 2025

Dr. Mamoru Doi
Director General
National Astronomical Observatory of Japan

The Steering Committee of the Group of Optical and Infrared Astronomers (GOPIRA) of Japan (†), representing the Japanese optical and infrared astronomy community, highly values the scientific significance of the Thirty Meter Telescope (TMT) project and strongly supports its advancement and realization.

Over the years, optical and infrared astronomy has made tremendous strides in uncovering the mysteries of the universe, thanks to the remarkable performance of large ground-based and space-based telescopes, such as the 8.2-meter Subaru Telescope on Maunakea. To maintain this momentum and continue the pursuit of astronomical discovery, the construction of the next-generation giant ground-based telescope—TMT—with its unparalleled sensitivity and resolution, is essential. TMT will offer more than 10 times the light-gathering power and over three times the resolution of current ground-based telescopes like Subaru, achieving more than a 100-fold increase in sensitivity for point sources. Compared to the James Webb Space Telescope (JWST), launched in 2021, TMT will deliver approximately 20 times greater sensitivity and five times better angular resolution. This capability enables a highly effective strategic approach: for example, rare celestial objects discovered through wide-field observations by Subaru can be investigated in detail with follow-up observations by TMT.

TMT's high spatial resolution and extreme contrast imaging will enable direct detection of biomarkers on Earth-like exoplanets. Its large collecting area will facilitate spectroscopic studies of extremely distant galaxies, revealing the physical conditions of early galaxies and shedding light on the cosmic reionization history. Moreover, ultra-precise radial velocity measurements with TMT can directly measure the expansion of the universe, potentially revealing the nature of dark energy. In addition, TMT will play a critical role in the rapidly evolving field of multi-messenger astronomy, which includes gravitational wave and neutrino detections. Rapid follow-up observations in the optical and infrared with TMT will be indispensable for fully exploiting the nature of the source. The anticipated scientific breakthroughs enabled by TMT are too numerous to list. Its scientific value is truly immense.

Importantly, while Europe's 39-meter Extremely Large Telescope (E-ELT) and the U.S.'s

Giant Magellan Telescope (GMT) are both being constructed in Chile in the Southern Hemisphere, TMT is uniquely positioned in the Northern Hemisphere on Maunakea, Hawaii. This geographical complementarity ensures access to the entire sky, enabling continuous and comprehensive observations of the universe only when these facilities coexist. Furthermore, among the next-generation telescopes under development, TMT will be constructed at the highest elevation, making it particularly suitable for observations in the mid-infrared and ultraviolet due to the higher atmospheric transmission. In the mid-infrared range, TMT will offer higher spatial and spectral resolution than JWST.

Given the above, TMT is not only vital to the future of Japanese astronomy, but also indispensable for advancing humanity's exploration of the universe. Recognizing this, GOPIRA has continuously identified TMT as the highest-priority project for the Japanese optical-infrared astronomy community since 2006. Most recently, the Future Planning Committee, established under GOPIRA in 2021 to assess and chart the long-term vision of the field, reaffirmed this stance by declaring that "positioning the ground-based TMT project as the top priority remains unwavering." The upcoming GOPIRA Roadmap 2025 will also highlight TMT as the highest-priority project. Researchers affiliated with GOPIRA have been deeply involved in the TMT project since its conceptual phase. We will continue to contribute human resources, share expertise and experience, and actively explore ways to promote close collaboration with other domestic and international observational facilities.

TMT is the cornerstone of optical and infrared astronomy in the 2030s and beyond. The Steering Committee of GOPIRA continues to identify TMT as the top-priority project and, on behalf of the Japanese optical-infrared astronomy community, strongly support its advancement and realization.

(†) The Group of Optical and Infrared Astronomers (GOPIRA) is the representative organization of Japan's optical and infrared astronomy community. It was established in 1980 as an independent association of researchers to promote the advancement of optical and infrared astronomy. It is one of the most long-standing communities of its kind in the field of astronomy and astrophysics. With approximately 344 members today, the GOPIRA represents the community in making a wide range of proposals and has contributed to the realization of the Subaru Telescope, which was completed in 1999.

Tadayuki Kodama

Chair, Steering Committee
Group of Optical and Infrared Astronomers (GOPIRA)