

8:30～ Registration

8:50～ Opening talk

Sato, Tatsuhiro (Subaru /NAOJ)

9:00～

Special Talk 1**Chair : Fujii Yasunori (NAOJ)**

9:00

My Experience and Some Recommendation for English**Tatematsu, Kenichi** (Nobeyama Radio Observatory/NAOJ)

I introduce the international development collaboration at Nobeyama Radio Observatory, and like to talk my experience and personal recommendation for English learning and English conversation.

9:25

Advanced Technologies in KAGRA, Large-scale Cryogenic Gravitational-wave Telescope**Tomaru, Takayuki** (KAGRA/NAOJ)

The KAGRA is a second generation gravitational wave telescope under test operation in Kamioka.

Some of advanced technologies in KAGRA are unique, especially underground site and cryogenic mirror system are only equipped by KAGRA.

Sometime KAGRA is called as a 2.5th generation telescope from these features which are planed to use in 3rd generation GW telescopes in the world.

In this talk, the KAGRA project and expected science will be introduced.

9:50

NAOJ ALMA Project - A perspective of internationalization**ALVARO GONZALEZ GARCIA** (ALMA/NAOJ)

The Atacama Large Millimeter/submillimeter Array (ALMA) is a giant radio telescope which was constructed in the Atacama desert in Northern Chile in cooperation with the Republic of Chile, through global partnership of East Asia (Japan, Taiwan and Korea), North America (USA, Canada and Taiwan), and the member states of the European Organisation for Astronomical Research in the Southern Hemisphere (ESO). It is the most powerful (sub)mm-wave telescope on Earth and has been producing ground-breaking science since it became operative in 2011.

The interface between ALMA and East Asia is provided by the East Asian ALMA Support Center (EA ASC), located in Mitaka and managed by the NAOJ ALMA Project, a division of NAOJ. The NAOJ ALMA Project encompasses a wide range of activities including engineering, development, computing, scientific observation support, research promotion, and Education and Public Outreach.

In this presentation, I will reflect on the very international character of the ALMA Project in the current background of international Astronomy and NAOJ.

10:15

ALMA Integrated Computing Team (ICT): Implementation of International Four-region Structure**Kosugi, George** (ALMA/NAOJ)

10:40～ Coffee Break

10:50～	Special Talk 2 Chair : Hayano Yutaka (NAOJ)
10:50	Future and International Collaboration of Subaru Yoshida, Michitoshi (Subaru Telescope/NAOJ) Subaru Telescope has the great advantage if wide field ($> 1 \text{ deg}^2$) observation capability with excellent optical performance in the optical infrared astronomy in the world. Currently, Hyper Suprime-Cam is the most productive instrument of Subaru, and in the near future, spectroscopy monster, Prime Focus Spectrograph will come. Planning of ULTIMATE-Subaru, next generation near-infrared observation facility, is also ongoing. In parallel, ultra high spatial resolution observations supported by the extreme AO, SCExAO, is active for exoplanet science. International collaboration is crucial not only to conduct these state-of-the-art instrumentation but also to realize sustainable and more productive operation of the telescope. I will briefly summarize the current activity of Subaru Telescope and give my perspective on the future international cooperation for instrumentation and operation of the observatory.
11:15	Integrated operation of Subaru and TMT Noumaru, Junichi (TMT/NAOJ) The government has told NAOJ that it would stop funding to Subaru Telescope once TMT is built. Since the scientific strategy of TMT depends on survey data provided by Subaru Telescope, it must be in operation even after TMT becomes operational. NAOJ is planning the integrated operation of Subaru and TMT to maximize synergy of two telescopes as well as to minimize the operation cost of both telescopes. In my presentation, I will discuss the goals of the integrated operation and the overview of the current plan.
11:40	Instrumentation Development at EAO Ho, Paul (East Asian Observatory) At the EAO/JCMT, current plans are to increase the sensitivity of all the resident instruments. The first upgrade has been to replace the 230GHz receiver with a copy of the GLT receiver system. Three inserts operating at 86GHz, 230GHz, and 345GHz, will support VLBI experiments as well as single dish experiments. These dual-polarization systems have greatly improved the sensitivity at 230GHz, and has enabled VLBI experiments at all three frequencies. The next upgrade will be a new 850μm camera using MKIDs devices. This new camera will be a collaboration between all the EAO partners, and the tasks were divided during a workshop at PMO in May 2019. The expected improvement is about a factor of 10-20 in speed. The third upgrade will be a new 345GHz heterodyne camera. Multiple groups are developing multi-pixel receivers. The current 16-pixel HARP receiver will be enlarged by a factor of 3 or more with dual polarizations.

12:05～ Lunch Break

13:00～	Special Talk3	Chair : Noumaru Junichi (NAOJ)
13:00	Opportunities and Challenges of Managing Thirty Meter Telescope Project Liu, Fengchuan (TMT International Observatory) This paper will describe current construction-phase status of the Thirty Meter Telescope (TMT), the only extremely large optical-infrared telescope in the northern hemisphere with diffraction-limited performance that will shape the landscape of astronomy for the next 50 years. The TMT International Observatory is a public-private-international partnership of India, Canada, China, Japan and the USA for this endeavor with all partners contributing to the design, development, and scientific use of the observatory. This paper will discuss the opportunities and challenges inherent to the management and engineering development of TMT in a truly global collaboration.	
13:25	Examples of NAOJ's Engineering Tasks in International Project: Case of Telescope Structure of Thirty Meter Telescope Sugimoto, Masahiro (TMT/NAOJ) Engineering in NAOJ consists of various activities, such as in-house developments of the cutting-edge devices for astronomical instruments, daily preventive maintenance, corrective maintenance/replacement activities to overcome the serious situation due to aging of telescope/observatory, etc. It is also notable that many projects/observatories are getting to be conducted/operated under international collaborations regardless of project size and phase. In this presentation, we introduce what type of engineering activities has been needed for the Telescope Structure (STR) of Thirty Meter Telescope project (TMT), which will be delivered by NAOJ as in-kind contribution with engaging Mitsubishi Electric Corporation (MELCO) to preliminary and final design works to date. The STR is the largest subsystem in TMT, i.e. many engineers (and managers) are involved to proceed STR-related tasks not only MELCO engineers who are working to do actual design under contract, but also engineers in international partners to control the interface between their subsystem and STR, system engineers who are responsible to manage overall system performance and configuration, etc. In order to realize smooth communication between physically/culturally-separated parties and to provide proper technical assessment against any issue that needs decision, system engineering (+coordination) activities inside STR subsystem is essential to proceed the project. Although such tasks might not be so attractive for many NAOJ engineers, we will introduce our team activities that needs technical knowledge/experience, ability to explain logically, patient/thoughtful mentality to overcome issues, and flexibility to introduce new idea.	

13:50 **International collaborations in space astronomy missions - past and future**

Mitsuda, Kazuhisa(NAOJ)

International collaboration is mandatory in contemporary space astronomy missions, Historically, the Ginga mission, which was inserted in orbit in 1989, was the first Japanese space astronomy mission which adopted significant international collaborations. After that all Japanese X-ray astronomy missions utilized international collaborations. Up to the most recent XRISM, all missions were Japan-lead, i.e. Japan was the major partner. In that era, the US and/or European countries had their own lead missions. However, the situation is changing: only one large mission is possible in the world at the same time. In such situation, Japan is likely to participate as a minor partner. Athena, the ESA (European Space Agency)'s Large mission is a good example. After participating in the Athena project for more than three years, I came to consider that it requires more engineering ability and sense in participating as a minor partner than as a major partner, because we must clearly explain our engineering process to other partners and at the same time we must understand other partner's engineering and find compromise among the partners. In the talk, I would like to mainly discuss about such aspect of international collaborations.

14:15 **Why do we pursue international collaboration?**

Tsuneta, Saku (NAOJ)

14:40～

Lightning talk

Chair : Noumaru Junichi (NAOJ)

14:40 **A day of an ALMA worker (TBD)**

Watanabe, Manabu (ALMA/NAOJ)

14:45 **Current status and issues of telescope maintenance**

Ueno, Yuji (VERA/NAOJ)

The budget for maintenance and operation of NAOJ equipment is decreasing year by year. For this reason, telescope maintenance is required to be changed to a lower cost method. I will report on the on-site efforts to realize the lower cost maintenance and problems that we faced when we were tackling it.

14:50	Requirements to Contribute Multiple International Projects as a Specialist Tsuzuki, Toshihiro (ATC/NAOJ) Many projects are ongoing at NAOJ, and there are great opportunities for engineers to participate in multiple international projects. Though participating in many projects has both pros and cons, it provides great benefits not only to the projects but also to the engineers themselves. From the engineers' perspective, they can obtain the genuine cutting-edge skills and knowledge by engaging in the many active projects. From the projects' perspective, they benefit from the engineers' skills and knowledge that were obtained from other projects and this helps reduce the development cost and risks. I have been involved in various projects from space telescope missions in UV to ground-based telescope missions in radio wave. What I have learned is that the success of engaging in multiple projects depends not only on the capabilities of the engineers but also on the capabilities of the individual involved in the projects. In this lightning talk, I will explain the necessary conditions for engineers to contribute to multiple international projects.
14:55	Telescope Utility Service (TUS) of Thirty Meter Telescope (TMT) Tazawa, Seiichi (TMT/NAOJ) The Telescope Utility Service (TUS) of the Thirty Meter Telescope (TMT) provides services and service routes to all telescope subsystems and scientific instruments attached to the telescope. Currently, the TUS design is in progress for the TUS final design review. In this short presentation, I will provide a brief overview of TUS.
15:00	TBD
TBD	

15:05～ Coffee Break

15:15～	Group Discussion MC : Tatsuhiro Sato (NAOJ)
15:15	Description of Group Discussion
15:20	Group Discussion
16:40	Each Group Presentation

17:00～	Closing Talk	Mitsuda Kazuhisa (JAXA • NAOJ)
18:00	Banquet	