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Long-term plan of astrophysics and space infrared astronomy missions

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In order to conduct top-level astronomical research, large observation equipment is required. This goal requires strategic long-term planning for the achievement of large observation equipment, based on the discussions in the community. In this lecture, as an example of large observation equipment, we present an overview and planning process in the community on an infrared astronomical satellite called SPICA.

SPICA (Space Infrared Telescope for Cosmology and Astrophysics) is the next-generation infrared astronomical satellite, which aims to reveal the cosmic history from the big bang to the emergence of life. SPICA will carry a 3m-class (current baseline is 3.5 m) telescope, which will be cooled down to 6 K in orbit. This enables us to achieve the unprecedented high resolution (due to large aperture). To achieve large-aperture in space, SPICA telescope will be launched at ambient temperature and will be cooled in space using the combination of effective radiative cooling and mechanical cryocoolers, which have been developed in Japan.

In Japan, the SPICA concept has been studied for more than 10 years by the SPICA working group, which consists of more than 200 members of astronomers. The optical and infrared astronomical community in Japan compiled a long-term plan in 2005, and published a brochure entitled "Optical and infrared astronomy in 2010's". In this brochure, SPICA was recommended as the space mission with the top priority. The science council of Japan is now compiling a long-term plan for astronomy and astrophysics, and SPICA is planned to be recommended as one of the big projects, which should be promoted as national projects.

On the basis of these activities, the mission proposal of SPICA was submitted to JAXA in September 2007. After a series of reviews, SPICA pre-project team was formed officially in JAXA in July 2008.

Astronomers all over the world have been showing strong interest to SPICA. European astronomers submitted a proposal to participate the SPICA program under the frame work of "ESA cosmic vision 2015-2025". It was successfully accepted, and the assessment study have been performed in Europe. Review processes is going on for the next phase. Other international collaborations including US and Korean participations have been discussed extensively.

Thus, SPICA is a Japan-lead world-class mission. The target of the launch is 2018.

Keywords: astronomy, infrared astronomical satellites, AKARI, SPICA, long-term plan