SPICA selected as an ESA Cosmic Vision M5 candidate

SPICA Japan Team

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Space Infrared Telescope for Cosmology and Astrophysics (SPICA) was selected as one of the three candidates of the 5th Medium-class mission (M5) in ESA's Cosmic Vision program (notes 1, 2). The SPICA proposal was submitted to ESA by the international consortium led by the Netherlands Institute for Space Research (SRON), with the participation of 16 European countries, Japan, USA, Canada, and Taiwan in October 2016. The SPICA Japan team, which consists of members from JAXA, Nagoya University, other universities and research institutes, made essential contributions to the proposal submission.

SPICA is the next-generation infrared astronomy mission. With its unprecedented sensitivity in the infrared, SPICA aims to reveal (1) the formation processes of galaxies and roles of black holes in galaxy evolution and (2) evolution processes from protoplanetary disks to planetary system. SPICA is expected to be launched in the next decade.

SPICA is an international mission based on Europe-Japan collaboration. Japan is responsible for the SPICA cryogenic system, which is essential for high-sensitivity infrared observations, and SPICA Mid-Infrared Instrument (SMI), which is to being developed by the consortium led by Nagoya University. Japan is also in charge of launching operation with an H3 rocket. ESA is responsible to lead the project, for the satellite system, and for the SPICA telescope. A consortium led by SRON, Netherlands with European countries, USA, Canada, Japan, and Taiwan is responsible for the SpicA FAR-infrared Instrument (SAFARI). A European consortium led by CEA, France is responsible for a small far-infrared camera and polarimeter (POL).

In Japan, SPICA is officially recognized as an important future mission: SPICA is mentioned as one of the "strategic L-class missions of space science" in "the Basic Plan on Space Policy" issued by the Cabinet Office of the Japan. Moreover, SPICA was selected as one of "core programs" in "Masterplan 2017 for the large research plans" issued by Japan Science Promotion Society as well as one of the key programs in "Roadmap 2017 - Fundamental Concepts for Promoting Large Scientific Research Projects" issued by the Ministry of Education, Culture, Sports, Science and Technology. With these strong supports from the academic communities in Japan, the SPICA Japan team has been advancing the concept study of SPICA.

In Europe, SPICA is assumed to be realized under the framework of the ESA Cosmic Vision. Hence the SPICA's advance to the final round as a candidate of the M5 mission will strengthen international collaboration scheme for SPICA significantly.

One of the three candidates is expected to be selected as the M5 mission in 2021. JAXA will keep offering strong support toward the final selection.

Related Websites

- ESA selects three new mission concepts for study
  http://sci.esa.int/cosmic-vision/60257-esa-selects-three-new-mission-concepts-for-study/
- ISAS/JAXA SPICA Homepage
  https://www.ir.isas.jaxa.jp/SPICA/SPICA_HP/index.html
- Space Astronomy Laboratory, Infrared Group (Uir), Nagoya University
  http://www-ir.u.phys.nagoya-u.ac.jp/

Footnote

- 1: Cosmic Vision is ESA's long term program in space sciences. Below are the medium class (M1-M4) missions so far selected by ESA.
  - M1: Solar Orbiter: a mission for close-up observations of the Sun
  - M2: Euclid: a mission to study dark energy and dark matter
  - M3: PLATO: a mission to search for exoplanets and to measure stellar oscillations
  - M4: ARIEL: a mission to carry out remote-sensing of atmosphere of exoplanets in the infrared
- 2: Below are the three candidates for the final M5 round in the Cosmic Vision Program.
  - SPICA: SPace Infrared telescope for Cosmology and Astrophysics
  - EnVision: mission to the Venus
  - Theseus: Transient High Energy Sky and Early Universe Surveyor

Figures

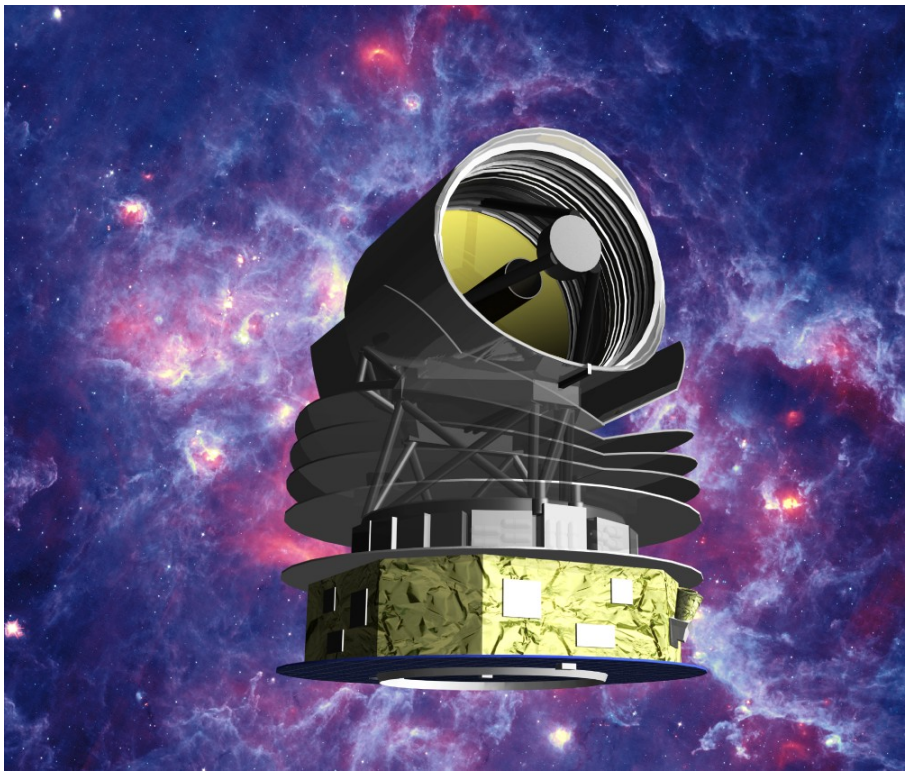

Fig. 1 An artistic view of SPICA with the infrared image of the Cyg-X regions observed with AKARI.

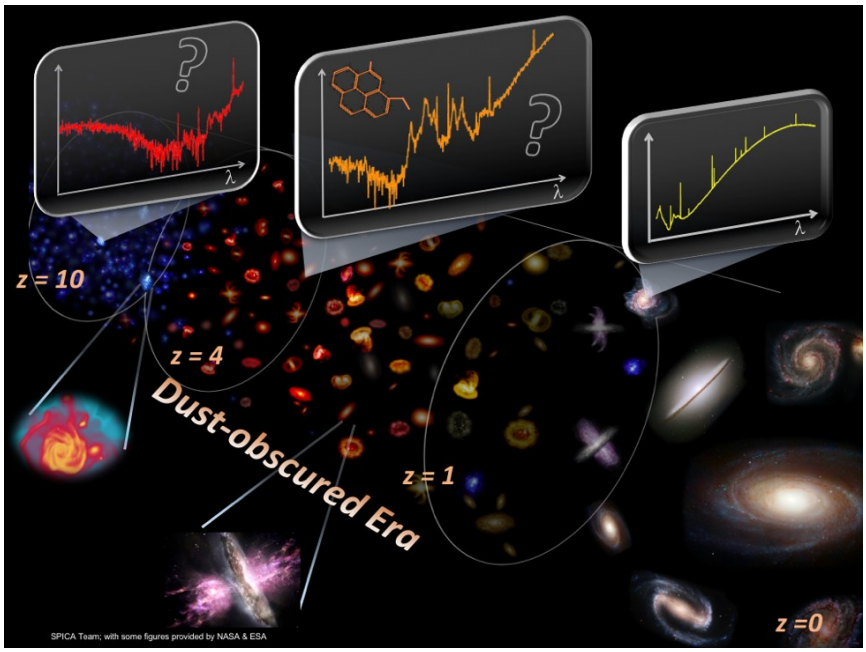

Fig. 2 SPICA enables us to search for dust grains in the very early universe, and to study properties of galaxies in the era of explosive star formation as well as nearby galaxies in the recent era through analyses of the infrared light from dust grains and gas. SPICA will thereby reveal how galaxies were formed and evolved along the history of universe.

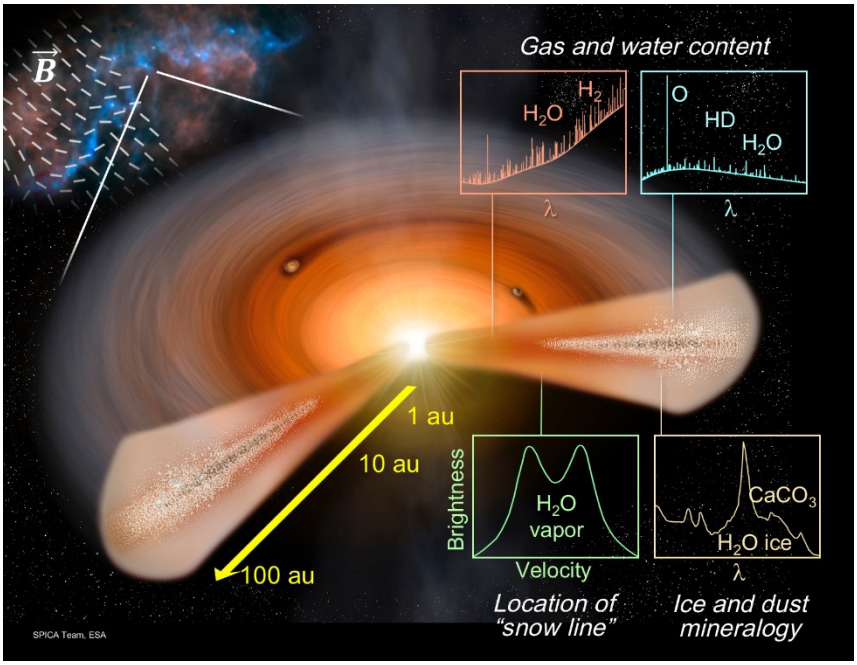

Fig. 3 SPICA will unveil the condition of star formation through observations the interaction between interstellar matter and magnetic fields. SPICA will further reveal detailed distribution and properties of gas, dust grains, and water/ice in protoplanetary disks surrounding new-born stars.