

Nobeyama 45-m Telescope, 1982

Proposer: IEEE Tokyo Section with National Astronomical Observatory of Japan and Mitsubishi Electric Corp.

- Built in 1982 as the largest millimeter telescope for radio astronomy
- Providing High resolution and high sensitivity observational capability to astronomers all over the world
- Contributed to the progress of astrophysics and interstellar chemistry
- Observed emission from molecules, masers, and plasmas in the universe.
- Providing the deep insight of interstellar matter in our galaxy or extra-galaxies including discovery of a black hole or detection of bio molecules.



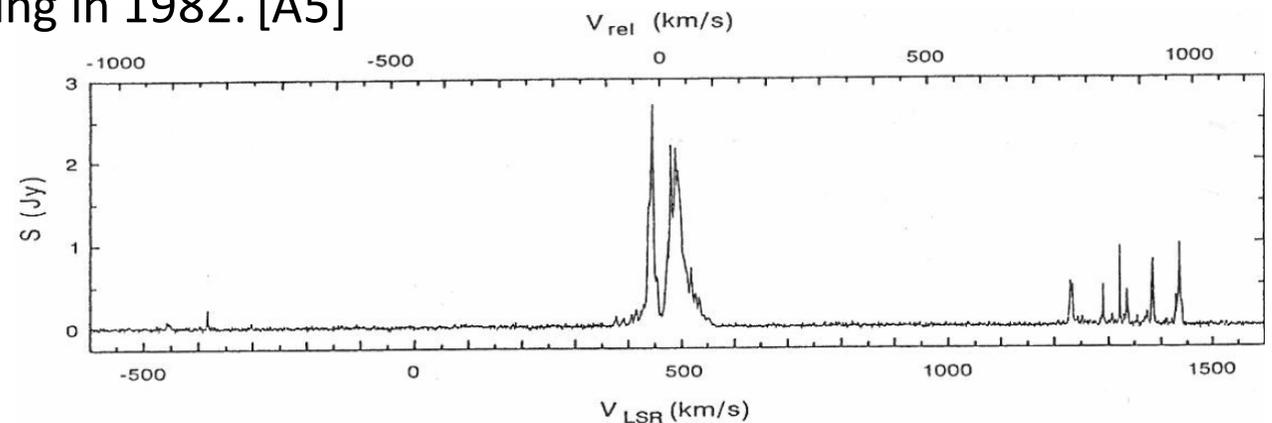
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Significant Achievement and Social Impacts

- Radio Spectra of fine structures of various astronomical objects have been taken. [A1]
- Several new molecules were identified in the universe. [A1, A2]
- High velocity water vapor emission from the galaxy center was detected leading to firm evidence of presence of a black hole with later high-angular observations [A3]
- Methyl amine, potential precursor of amino acid glycine, was found to be rich in some star forming regions suggesting that biomolecules such as amino acids form in the universe. [A4]
- More than 3 million visitors have come to the Nobeyama Radio Observatory mainly to see the Nobeyama 45-m telescope since its opening in 1982. [A5]



One of the newly discovered molecule C₆H [A2]



Radio spectrum of H₂O molecules toward a black hole in the center of the Galaxy NGC 4258 [A3], ©National Astronomical Observatory of Japan

Influence to the following radio telescopes

- The Usuda 64-m telescope: 64-m telescope for satellite communication including Hayabusa located at Usuda-city in Nagano by Japanese Aerospace X Agency (JAXA)
- ASTE (Atacama Submillimeter Telescope Experiment): 10-m telescope operational at submillimeter wavelengths at an altitude of 4800 m in Atacama Desert in northern Chile by National Astronomical Society of Japan (NAOJ).
- VERA (VLBI earth rotation array): four 20-m telescopes forming an array with xx km baseline located in four places in Japan by NAOJ.
- ACA (Atacama Compact Array) 12-m and 7-m telescopes comprises ALMA (Atacama Large Millimeter and Submillimeter Array) operational between 30 – 950 GHz at an altitude of 5050 m in Atacama Desert in northern Chile by NAOJ.

Citation

- In 1982, Tokyo Astronomical Observatory in collaboration with Mitsubishi Electric Corporation completed the 45-m telescope as the world's largest antenna for millimeter wave radio astronomy. The innovative engineering of the 45-m telescope has contributed to the progress of radio astronomy by enabling high resolution and high sensitivity observations. Notable discoveries include new interstellar molecules and a black hole.