P147a The Detection of a Hot Molecular Core in the Extreme Outer Galaxy

Takashi Shimonishi (Niigata University), Natsuko Izumi (ASIAA), Kenji Furuya (NAOJ), Chikako Yasui (NAOJ)

Interstellar chemistry in low-metallicity environments is crucial to understand chemical processes in the past metal-poor universe. Recent studies of interstellar molecules in nearby low-metallicity galaxies have suggested that metallicity has a significant effect on the chemistry of star-forming cores. We here report the first detection of a hot molecular core in the extreme outer Galaxy, which is an excellent laboratory to study star formation and the interstellar medium in a Galactic low-metallicity environment. The target star-forming region, WB 89-789, is located at a galactocentric distance of 19 kpc. Our ALMA observations in 241-246, 256-261, 337-341, and 349-353 GHz have detected a variety of carbon-, oxygen-, nitrogen-, sulfur-, and silicon-bearing species, including complex organic molecules (COMs) containing up to nine atoms, toward a warm (>100 K) and compact (<0.03 pc) region associated with a protostar. Deuterated species such as HDO, HDCO, D_2CO, and CH_2DOH are also detected. A comparison of fractional abundances of COMs relative to CH_3OH between this outer Galactic hot core and an inner Galactic counterpart shows a remarkable similarity. The results suggest that great molecular complexity exists even in the primordial environment of the extreme outer Galaxy. We also report the detection of another embedded protostar associated with high-velocity SiO outflows in the WB 89-789 region.