

R15b Starburst feedback and the superwind in M82: high-resolution observations of molecular gas with CARMA and Nobeyama 45-m telescopes

Dragan Salak, Naomasa Nakai (Univ. of Tsukuba), Jin Koda (Stony Brook Univ.), and Yusuke Miyamoto (Ibaraki Univ.)

M82 is a nearby (~ 3.5 Mpc) starburst galaxy with a superwind - outflow of gas and dust from the galactic central region. In order to study the relation between the central starburst and the galactic wind feedback, we have carried out multi-line observations of molecular gas (previously reported at the ASJ meeting at Tohoku Univ. R27a). High-resolution observations of CO (1-0) have now been completed with the CARMA telescope as part of the CARMA-Nobeyama Nearby Galaxies Survey (CANON). The missing flux was recovered by combining interferometer and single-dish (Nobeyama 45m) data. The angular resolution in the final data cube is $2.8'' \times 2.5''$ (~ 45 pc).

We have found that the behavior of the molecular gas outflow is related to the history of star formation based on a “two-episode” starburst model, one $\sim 10 - 50$ Myr ago, and the other ~ 5 Myr ago. Previously detected large-scale outflow (~ 2 kpc) reflects the feedback from the first starburst event that took place on a large scale in the central ~ 1 kpc of M82. The second starburst event has occurred in the 300-pc ring of molecular gas. High-resolution data reveal nascent outflows (shells) with expansion velocities of the order $50 - 100$ km s^{-1} ejected from the nuclear ring. Thus, the starburst (wind) feedback is tracing the regions of recent vigorous star formation in the nuclear ring in M82.