

ALMA close-up view of dense molecular medium in the central regions of nearby active galaxies

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uring the initial early science operation of ALMA, more than a dozen of active galaxies in the local universe have been observed. The sensitivity of ALMA is already superb enough to unveil new views of well-studied galaxies such as NGC 1068, NGC 1097, and NGC 253. In the band 7 observations of NGC 1068 (Garcia-Burillo et al.), the circumnuclear disk (CND) has been depicted in unprecedentedly high sensitivity with $\sim 0''.5$ or ~ 30 pc resolution; two knots of CND are found to be a part of a continuous ring, and a clear velocity gradient along the south-to-north direction has been found, implying that CND has a different rotation axis from a $>kpc$ scale disk. A compact peak is newly unveiled in both HCN(4-3) and HCO⁺(4-3) at the vicinity of the active nucleus (referred to "S1"), whereas nothing is seen in CO(3-2), implying that the kinetic temperature of the compact nuclear peak is extremely high, where CO may be poorly populated even in J=3. This may be consistent with the presence of shocked H₂ emission at the near-infrared band there. The observed HCN/HCO⁺ flux ratio in J=4-3 transition significantly exceeds unity, giving a coherent view in the low-J transitions. Our cycle 0 observations of NGC 1097 in Band 3 detected 9 lines from molecules including HCN, H¹³CN, HCO⁺, H¹³CO⁺, C₂H, HNCO, SiO, CS, and HC₃N. Elevated HCN/HCO⁺ ratio was confirmed at the nucleus, despite of its low luminosity nature. We suggest that shock heating plays a role based on the elevated SiO. I will also show highlights from a wide spectral scan in NGC 4418 (Costagliola, Aalto et al.).