R31a The large-scale features of the molecular gas in M82

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In this talk I report new results from the analysis of the kpc-scale structure of CO (J=1-0) emission detected in the nearby starburst galaxy M82. The galaxy was mapped on a 15 x 17 arcmin^2 scale in 2009 and 2010 with the 25-beam receiver on the NRO 45m telescope. The outline of the first results was reported in the previous meeting of the ASJ (poster R37c).

This time I present an anlysis to distinguish and describe the CO emission morphology in the three prominent large-scale components of the molecular gas: the disk, the outflow, and the tidal streams. First, we discuss the kinematic features of the molecular gas in the plane of the galaxy; the emission from the south-west side is composed of two components rather than one as previously observed. Second, above the galactic plane we find a very broad outflow with a conserved angular momentum. The boundary between the disk and the outflow is deduced from the spectra and spurs in the integrated intensity map, so the angle of the outflow cone is measured.

The overall CO distribution is compared with other data. CO and the H2 emissions are correlated well in the central regions but poorer in the outflow and the eastern stream: "warm" hydrogen is brighter than CO in the outflow where we expect diffuse and warmer gas. This is also supported from LVG modeling of CO J=1-0, J=2-1 and J=3-2 based on the line intensity ratio maps.