CO TULLY-FISHER RELATION FOR THE DISTANCE MEASUREMENT TO REDSHIFT CZ=20,000 TO 50,000 KM/S

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The accuracy of measurement of the Hubble constant depends not only on the accuracy of distance measurement but also on how small is the effect of local flows: The larger are redshifts of used galaxies, the higher is the accuracy of H_0, if the error in distance measurement is comparable. The HI Tully-Fisher relation has been the standard tool for distance measurement up to $cz \sim 10,000$ km s^{-1} (Tully and Fisher 1977), where, however, the local flow is not negligible.

In order to reach farther galaxies, we have proposed to use the mm-wave CO line instead of HI, mainly because of the smaller beam-size and high velocity resolution achieved at mm-wavelengths (Sofue et al 1996). We have conducted a long-term project with the Nobeyama 45-m telescope to measure the distances of galaxies at $cz = 10000 \sim 50000$ km/s using the CO-line Tully-Fisher relation. We obtained high-quality optical imaging and photometry using the Okayama 1.88-m and CFHT 3.6-m. We have determined their distances, and estimated the Hubble ratios to be 50 to 80 km/s/Mpc for galaxies at $cz = 20000 \sim 26000$ km/s. We have further obtained CO line width data for galaxies at cz=30000 to 50000 km/s, and are currently conducting a project to deter-min the distances in the hope that we will be able to provide with a more reliable Hubble constant without being disturbed by local flows.

References

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