Near-Infrared Survey and Photometric Redshifts in the Extended GOODS-North field

Li-Ting Hsu[1]; Lihwai Lin[1]; Bau-Ching Hsieh[1]
[1]*Institute of Astronomy & Astrophysics, Academia Sinica, Taipei, Taiwan.*

To understand the evolution of the galaxies, near-infrared (NIR) imaging is essential because: (1) NIR can used to identify Balmer break of galaxies at $1<z<4$, (2) NIR luminosity reflects the stellar mass of galaxies, and (3) NIR is less affected by the dust extinction comparing to optical observation. In this work, we will present deep NIR images (J, H, and Ks) of the extended Great Observatories Origins Deep Survey-North (GOODS-N) field observed from the CFHT/WIRCAM. The data reaches 5-sigma limiting AB magnitudes (in 2" aperture) of J=24.6 mag, H=23.8 mag, and Ks=24.1 mag over ~0.25 deg^2. In the GOODS-N field, several deep multi-wavelength surveys have been carried out for various science goals, including radio survey from the VLA, FIR survey from the Herschel, MIR survey from the SEDS, optical survey from the Subaru telescope, and X-ray survey from the 2Ms-CDFN. Our NIR survey can be an essential complementation in this field. In addition to the NIR images, we will also release photometric redshift (photo-z) catalogs for non-X-ray and X-ray sources along with NIR photometry. For non-X-ray sources, we obtain the photo-z accuracy of sigma_NMAD=0.034 with the outlier fraction=7.4%. For X-ray sources, the photo-z accuracy of sigma_NMAD is 0.051 and the outlier fraction is 12.1%. Our photo-z qualities are similar to the previous work, however, we show a smaller median value of $|(z_{phot} - z_{spec})|/(1 + z_{spec})$, which indicates the distribution of the difference between z_{phot} and z_{spec}. We have improved on the general underestimated photo-z from the former work by Yang et al. (2014).