[포GC-18] Core-Collapse Supernovae in Spiral Galaxy M74 and the Hubble Constant

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M74 is a nearby face-on spiral galaxy that hosts three core-collapse supernovae (SNe) : SN Ic 2002ap, SN II-P 2003gd, and SN II-P 2013ej. Therefore it is an ideal target to investigate the properties of the core-collapse SNe and to improve the calibration of Type II-P SNe as a standardizable candle. However, its distance is not well known. We present a new distance estimate to M74 based on the tip of the red giant branch (TRGB). From the photometry of archival F555W and F814W images taken with the Hubble Space Telescope, we derive the TRGB to be at ITRGB = 26.13 ± 0.02 and the distance modulus to be 30.04 ± 0.04 (random) ± 0.12 (systematic) (corresponding to a linear distance, 10.19 ± 0.14 ± 0.56 Mpc). With this result, we calibrate the standardized candle method of SNe II-P. From the absolute magnitude of SN 2003gd corrected for its expansion velocity and reddening, we derive the value of the Hubble constant, H0 = 72 ± 6 ± 7 km s-1 Mpc-1. It is in agreement with the uncertainty with the recent estimates based on the luminosity calibration of Type Ia SNe.

[포GC-19] Identification of High Frequency Peakers with long-term monitoring observation at 22 and 43 GHz

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High Frequency Peakers (HFPs) are radio-loud Active Galactic Nuclei (AGN), which are regarded as being in the earliest evolutionary phase (102-103 years) of radio galaxies. They are expected to be small in size (< ~1 kpc) compared to their host galaxies (~a few 10s kpc), and have convex spectra, which are peaking at high radio frequency (> 5 GHz). Their size and spectral shape are the most obvious supporting evidence of extremely young ages. HFPs are therefore ideal targets to probe the earliest stage of radio sources. To date however, the young radio source classification has been relying mainly on the spectral shape which usually does not cover high enough frequencies where the true peak flux is located. Hence HFPs are often confused with blazars which may show a similar spectral shape and apparent compactness but are a somewhat evolved form of AGNs. Therefore, we have been challenging to identify HFPs among the sample of 19 candidates using the Korean VLBI Network (KVN) which enables us to extend the radio spectrum baseline up to 22 and 43 GHz. These are higher than the frequencies used in most previous studies of HFPs, allowing us to select genuine HFPs. By long-term monitoring of 18 epochs, we have also inspected the variability of the sample to select out blazars which are highly variable yet with a similar radio spectrum. In this work, we present the light curves and spectral properties of the HFP candidates. We discuss the results of our re-identification of HFPs.