

places to test galaxy evolution models in connection to the environments. The environment studies of galaxies at $z \sim 1$ are important because the environmental quenching seems to be an important mechanism to reduce star formation activities in galaxies at $z < 1$.

However, there have been not many studies about high redshift galaxy clusters at $z \sim 1$ because of the lack of wide and deep multi-wavelength data. We have used the multi-wavelength data from the UKIDSS DXS (J and K band), the SWIRE (4 IRAC bands), and the PAN-STARRS (g, r, i, z, y bands) in the ELAIS-N1 field. We identified galaxy cluster candidates at $0.2 < z < 1.6$ using the multi-wavelength data.

We found several superclusters where cluster candidates are concentrated on few tens of Mpc scale. Interestingly, some of the supercluster candidates consist of galaxy clusters which have high blue galaxy. We will present high redshift galaxy cluster and supercluster candidates in ELAIS-N1 field and galaxy properties in different environments including dense clusters and fields.

성간물질 / 별생성 / 우리은하

[포 IM-01] Outflow properties of DIGIT embedded sources

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We present a study of outflows on 24 embedded young stellar objects selected from the source list of the Dust, Ice, and Gas in Time (DIGIT) Herschel key program. To study the relation between the CO outflows observed in low-J transitions and the properties of protostars more consistently with a homogeneous data set, we mapped the CO outflows of the selected targets in the $J = 1-0$ and $J = 2-1$ lines with two Korean telescopes (SRAO and TRAO). We compare CO outflow force (F_{CO}) with the bolometric luminosity, (L_{bol}) bolometric temperature, and the FIR molecular line luminosities of CO, H₂O, OH, and [O I] detected by the Herschel-PACS observations. We find that F_{CO} of $J = 1-0$ is greater than that of $2-1$ by a factor of ~ 2 . The well known correlation between $F_{CO\ 2-1}$ and L_{bol} is not very evident in our sample as a

whole, but they show a rather strong correlation when IRAM 04191+1522 is excluded. IRAM 04191+1522 has relatively high $F_{CO\ 2-1}$ in spite of its low L_{bol} . This object is a well-known VeLLO, which is believed in the quiescent phase of the episodic mass accretion in the embedded stage. L_{bol} traces a current accretion, but $F_{CO\ 2-1}$ traces accretion happened long ago. Therefore, the low- L_{bol} with the high- $F_{CO\ 2-1}$ can be explained by the episodic accretion. $F_{CO\ 2-1}$ shows little correlation with individual FIR line luminosities of CO, H₂O, OH, while [O I] and total FIR line luminosity seem to have correlations with $F_{CO\ 2-1}$. This result is interpreted as the accretion energy deposits on species differently depending on shock properties, but the total FIR line luminosity sums the total accretion energy dispersed to different species.

[표 IM-02] Chemical Distributions of Carbon-Enhanced Metal-Poor (CEMP) Stars from the Baryon Oscillations Spectroscopic Survey (BOSS)

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We present spatial and chemical distributions of Carbon-Enhanced Metal-Poor (CEMP) stars in the Milky Way's halo, as observed by the Baryon Oscillation Spectroscopic Survey (BOSS). Although the BOSS was designed to obtain spectra of galaxies and quasars, it also observed numerous metal-poor main-sequence turnoff stars for the purpose of flux calibration. The stars observed in the BOSS are two magnitudes fainter ($15.5 < g < 19.2$) than those in the legacy SDSS, thus it is an extremely useful sample to probe the distant halo. Using effective temperatures, surface gravities, [Fe/H], and [C/Fe] derived for these stars by the SEGUE Stellar Parameter Pipeline (SSPP), we investigate the spatial distribution of [Fe/H] and [C/Fe], the distribution of [C/Fe], and frequency of CEMP stars among these stars. These tools enable characterization of the origin of the halo and its initial mass function.

[표 IM-03] Dark Matter Content in Three Galactic Globular Clusters - 47 Tuc, NGC 1851, and M 15

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