Point Sources in the Galactic Center

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We present preliminary results of our long-term (2009-2017) observing campaign using the NASA IRTF at Mauna Kea, to obtain 2 – 5 μm spectroscopy of ~200 red point sources in the line of sight to the Galactic center. Point sources in our sample were selected from the mid-infrared images of the Spitzer Space telescope, and include candidate massive young stellar objects, which have previously been identified from our Spitzer/IRS spectroscopy. We show high foreground extinction of these sources from deep 3.1 μm H2O ice and aliphatic hydrocarbon absorption features, suggesting that they are likely located in the central 300 pc region of the Galactic center. While many sources reveal photospheric 2.3 μm gas CO absorption, few of them clearly indicate 3.54 μm CH3OH ice absorption, possibly indicating a large dust column density intrinsic to a massive young stellar object.

[포 IM-07] High-Resolution Spectroscopy of Hydrogen Emission Lines around a Herbig star, MWC 1080 with IGRINS

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Using IPHAS Hα data, we found bright Hα regions inside the elongated ^{13}CO cavity around a Herbig star, MWC 1080. To investigate the ionized hydrogen regions and the molecular cavity, we perform near-IR high-resolution spectroscopic of hydrogen Brackett lines and molecular hydrogen lines by Immersion GRating INfrared Spectrograph (IGRINS) observations. We detected broad Brackett line series and sharp molecular lines with various velocity components. We present three ionized hydrogen regions (near MWC 1080A, MWC 1080E, and CO boundary) with different line widths, central radial velocities, and line ratios. We also show two spatially-separate Brγ λ2.1662 μm peaks near MWC 1080A. To reveal a 3D structure of the cavity around MWC 1080, we try to use the detected sharp molecular lines.

[포 IM-08] Early Chemical Evolution of the Milky Way Revealed by Ultra Metal-Poor ([Fe/H] < -4.0) Stars

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Chemical abundance ratios of ultra metal-poor (UMP; [Fe/H] < -4.0) stars can provide important constraints on the early chemical enrichment of the Milky Way (MW), associated with the nucleosynthesis processes that occurred during the evolution of their progenitors, which are presumably the first generation of stars. Despite their importance, only about thirty UMP stars have been discovered thus far. In an effort to identify such stars additionally, we selected UMP candidates from low-resolution (R ~ 2000) spectra from the Sloan Digital Sky Survey and Large Sky Area Multi-Object Fibre Spectroscopic Telescope (LAMOST), and obtained with Gemini/GRACES high-resolution (R ~ 40,000) spectra of 15 UMP candidates. In this study, we present the results of the chemical abundance analysis of the UMP candidates. Furthermore, we compare the abundance patterns of our UMP stars with those of various metal-poor stars from literature to understand the early chemical evolution of the MW.

[포 IM-09] Characteristic Mass Function of First Generation of Stars Investigated by Extremely Metal-Poor ([Fe/H] < -3.0) Stars

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Even though the initial mass function (IMF) of the first generation of stars played important roles in reionization of the universe, subsequent star formation, and chemical enrichment of the universe, it is still very uncertain. In this study, among the several indirect ways of estimating the IMF of the population III (Pop III) stars, we make use of extremely metal-poor (EMP; [Fe/H] < -3.0) stars in the Milky Way, in order to infer the characteristic mass range of Pop III stars. As the progenitors of many of the EMP stars are known to be Pop III stars, we attempt to construct the characteristic mass range of the progenitors (e.g., Pop III stars) of the EMP stares by comparing their observed abundance pattern of various chemical elements with chemical yields from supernova models.

[포 IM-10] Impact of Interstellar Na on the