

Jeonghee Rho
SETI Institute, Mountain View, CA, USA

The origin of dust in the early Universe has been the subject of considerable debate. Core-collapse supernovae (ccSNe), which occur several million years after their massive progenitors form, could be a major source of that dust, as in the local universe several ccSNe have been observed to be copious dust producers. Here we report nine near-infrared (0.8 - 2.5 micron spectra of the Type II-P SN 2017eaw in NGC 6946, spanning the time interval 22 - 205 days after discovery. The spectra show the onset of CO formation and continuum emission at wavelengths greater than 2.1 micron from newly-formed hot dust, in addition to numerous lines of hydrogen and metals, which reveal the change in ionization as the density of much of the ejecta decreases. The observed CO masses estimated from an LTE model are typically 0.0001 Msun during days 124 - 205, but could be an order of magnitude larger if non-LTE conditions are present in the emitting region. The timing of the appearance of CO is remarkably consistent with chemically controlled dust models of Sarangi & Cherchneff.

[포 IM-05] Kinematic Study of Northern Filament in Orion Molecular Clouds Complex By ¹²CO Radio Observation

Hoon Jo¹, Jungjoo Sohn^{1*}, ShinYoung Kim², Jee Won Lee², Sungsoo Kim³, and Mark Morris⁴
¹*Korea National University of Education, Chungbuk 28173, Korea*
²*Korea Astronomy and Space Science Institute, Daejeon 34055, Korea*
³*Global Campus Kyung Hee University, Gyeonggi-do 17104, Korea*
⁴*University of California at Los Angeles, Los Angeles, California 951547, USA*

Orion Molecular Clouds Complex(OMC) 분자운에는 별 생성은 없으면서 은하면 방향으로 누워있는 큰 규모 (10° x 0.5°)의 필라멘트 구조가 있다. 본 연구는 북쪽 필라멘트(이하 NF)를 대상으로 12CO (J = 1-0) 선 관측 데이터를 이용하여 필라멘트의 운동학적 연구를 수행함으로써 은하면과의 상관관계를 알아보고자 하였다. 관측은 공간분해능은 2 arcmin인 SRAO(Seoul Radio Astronomy Observatory)의 6m 밀리미터 망원경이 사용되었고 큰 규모로 인해 은하면으로부터 먼 순서로 NF1, NF2, NF3 세 곳으로 관측 지역이 정해졌다. 연구결과 필라멘트는 매우 낮은 수준의 12CO (J = 2-1)과 티끌 분포에서 자기장을 따라 은하면 방향으로 연계되어 보였다. 밀도 분포에서

는 SRAO 12CO (J = 1-0) 적분강도와 Planck 위성의 12CO (J = 2-1)과 티끌 자료를 이용했을 때, 12CO와 성간 티끌은 주로 은하면에 수직인 방향에서 밀도가 높았다. 속도 분포와 위치 속도 분석을 통해 NF는 단일 구조의 분자운 형태이고 NF2 하단에서는 회전 운동의 가능성이 확인되었다. NF3는 자기장에 의해 생성된 나선형 회전을 하고 있으며, NF2와 NF3를 따라 은하면을 향하여 12CO (J = 1-0)를 비롯한 물질이 흐르고 있음도 확인되었다. 하지만 은하면을 향하여 물질이 흐르는 원인을 제공하는 천체가 무엇인지와 NF1과 NF2 상단의 회전 운동은 확인 할 수 없었으며 이들 지역에 대한 상세한 관측이 요구된다.

외부은하/은하단

[포 GC-01] Dust Radiative Transfer Model of Spectral Energy Distributions in Clumpy, Galactic Environments

Kwang-il Seon^{1,2} (선광일)
¹*Korea Astronomy & Space Science Institute*
²*University of Science & Technology*

The shape of a galaxy's spectral energy distribution ranging from ultraviolet (UV) to infrared (IR) wavelengths provides crucial information about the underlying stellar populations, metal contents, and star-formation history. Therefore, analysis of the SED is the main means through which astronomers study distant galaxies. However, interstellar dust absorbs and scatters UV and optical light, re-emitting the absorbed energy in the mid-IR and Far-IR. I present the updated 3D Monte-Carlo radiative transfer code MoCafe to compute the radiative transfer of stellar, dust emission through a dusty medium. The code calculates the emission expected from dust not only in pure thermal equilibrium state but also in non-thermal equilibrium state. The stochastic heating of very small dust grains and/or PAHs is calculated by solving the transition probability matrix equation between different vibrational, internal energy states. The calculation of stochastic heating is computationally expensive. A pilot study of radiative transfer models of SEDs in clumpy (turbulent), galactic environments, which has been successfully used to understand the Calzetti attenuation curves in Seon & Draine (2016), is also presented.

[포 GC-02] Comparison of the extraplanar H α and UV emissions in the halos of nearby

edge-on spiral galaxies

Young-Soo Jo^{1,2}, Kwang-il Seon^{1,3}, Jong-Ho Shinn¹, Yujin Yang¹, Dukhang Lee^{1,4}, and Kyoung-Wook Min²

¹*Korea Astronomy and Space Science Institute (KASI)*, ²*Korea Advanced Institute of Science and Technology (KAIST)*, ³*Astronomy and Space Science Major, Korea University of Science and Technology (UST)*, ⁴*York University, Toronto, Canada*

We compare vertical profiles of the extraplanar H α emission to those of the UV emission for 38 nearby edge-on late-type galaxies. It is found that detection of the “diffuse” extraplanar dust (eDust), traced by the vertically extended, scattered UV starlight, always coincides with the presence of the extraplanar H α emission. A strong correlation between the scale heights of the extraplanar H α and UV emissions is also found: the scale height at H α is found to be ~ 0.74 of the scale height at FUV. Our results may indicate the multiphase nature of the diffuse ionized gas and dust in the galactic halos. The existence of eDust in galaxies where the extraplanar H α emission is detected suggests that a larger portion of the extraplanar H α emission than that predicted in previous studies may be caused by H α photons that originate from H II regions in the galactic plane and are subsequently scattered by the eDust. This possibility raise an advantage in studying the extraplanar diffuse ionized gas. We also find that the scale heights of the extraplanar emissions normalized to the galaxy size correlate well with the star formation rate surface density of the galaxies. The properties of eDust in our galaxies is on a continuation line of that found through previous observations of the extraplanar polycyclic aromatic hydrocarbons emission in more active galaxies known to have galactic winds.

[포 GC-03] SAMI Galaxy Survey Data Release 2: Absorption-line Physics

Sree Oh^{1,2} (오슬희), Nicholas Scott^{2,3,4}, Jesse van de Sande^{2,3}, and the SAMI team

¹*The Australian National University*, ²*ARC Centre of Excellence for All Sky Astrophysics in 3 Dimensions (ASTRO 3D)*, ³*University of Sydney*, ⁴*ARC Centre of Excellence for All-Sky Astrophysics (CAASTRO)*

We present the second data release from the SAMI Galaxy Survey. The data release contains reduced spectral cubes for 1559 galaxies, about

50% of the full survey, having a redshift range $0.004 < z < 0.113$ and a large stellar mass range $7.5 < \log(M_{\star}/M_{\odot}) < 11.6$. This release also includes stellar kinematic and stellar population value-added products derived from absorption line measurements, and all emission line value-added products from Data Release One. The data are provided online through Australian Astronomical Optics' Data Central. Our poster presents stellar/gas kinematics on the metallicity-mass plane and highlight several galaxies from the SAMI Galaxy Survey that have interesting stellar and gas kinematics. For more information about data release 2, please see:

<https://sami-survey.org/abdr>.

[포 GC-04] Searching for Dwarf Galaxies in NGC 1291 obtained with KMTNet

Woowon Byun^{1,2}, Minjin Kim^{1,3}, Yun-Kyeong Sheen¹, Hong Soo Park¹, Luis C. Ho⁴, Joon Hyeop Lee^{1,2}, Hyunjin Jeong¹, Sang Chul Kim^{1,2}, Byeong-Gon Park^{1,2}, Kwang-Il Seon^{1,2}, Jongwan Ko^{1,2}

¹*Korea Astronomy and Space Science Institute*, ²*Korea University of Science and Technology*, ³*Kyungpook National University*, ⁴*Kavli Institute for Astronomy and Astrophysics, China*

We present newly discovered dwarf galaxy candidates in deep and wide-field images of NGC 1291 obtained with KMTNet. Through a visual inspection, we find ~ 13 candidates, for which central surface brightness ranges from $\mu_{0,R} \sim 22.5$ to 26.5 mag arcsec⁻¹. Adopting the distance to NGC 1291, the candidate dwarfs are brighter than $M_R = -12.5$ mag and their effective radii range from 350 pc to 1.4 kpc. Structural and photometric properties of dwarf candidates near NGC 1291 appears to be consistent with those of ordinary dwarf galaxies in nearby galaxies. We conduct the imaging simulation in order to find an optimal way to detect dwarf galaxies in KMTNet images and to test the completeness of our detection algorithm. We plan to apply this method to deep KMTNet images of other nearby galaxies obtained through KMTNet Nearby Galaxy Survey (KNGS).

[포 GC-05] AT2018cow : Photometric Analysis of Fast-evolving, Luminous and Bluish Transient

Gregory SungHak Paek¹, Myungshin Im¹, Changsu Choi¹, Gu Lim¹, Sophia Kim¹, Insu Paek¹, Sungyong Hwang¹, Taewoo Kim² and IMSNG team¹,

¹*Department of Physics and Astronomy, Seoul*