■ Session : 성간물질 (IM)
4월 28일(화) 16:00 - 17:45 제3발표장

[초IM-01] H3+, the New Astrophysical Probe

Takeshi Oka

Department of Astronomy and Astrophysics a(nd Department of Chemistry, The Enrico Fermi Institute, the University of Chicago, Chicago, Illinois, U. S. A.

After atomic hydrogen, H, and molecular hydrogen, H2, the protonated molecular hydrogen, H3+, is the third hydrogenic astrophysical probe which has been introduced recently. The infrared spectrum needed for its detection was discovered in the laboratory1 in 1980. The spectrum was discovered in Jupiter2,3 in 1989 and in interstellar space4 in 1996. The interstellar H3+ was first detected in dense molecular clouds4 where it had been predicted, but soon detected also in diffuse clouds5 where detectable H3+ was unexpected. Surprisingly, observations have established that the H3+ to H2 ratio is 10 times higher in diffuse clouds than in dense clouds6.Quite unexpectedly, H3+ has emerged as a powerful probe to study the diffuse interstellar medium. H3+ provides four kinds of astrophysical information: the temperature, T, the density n, the (cosmic ray) ionization rate ζ, and the radial length of clouds L. The surprising abundance of H3+ in diffuse clouds has revealed that the soft cosmic ray flux is 10 times higher in diffuse clouds than in dense clouds.7 H3+ is particularly abundant and ubiquitous in the Central Molecular Zone (CMZ), a region of radius ~200 pc near the Galactic center. Observations has led to the discovery of a vast amount of warm (T ~ 250 K) and diffuse (n ~ 100 cm-3) gas in the CMZ8,9. H3+ has also been detected in an ultra-luminous infrared galaxy IRAS 08572+3915 NW10. The recent results will be discussed.

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[IM-02] The spatially resolved mid-infrared emissions in BD+30 3639

In-Ok Song[1], Thomas R. Geballe[2], Hyungmok Lee[1]

[1]Department of Physics and Astronomy, Seoul National University, [2]Gemini Observatory, Hilo Hawai'i, U.S.A

We present the mid-infrared emissions from the planetary nebulae, BD+30 3639 whose spectra are obtained from MICHELLE instrument at GEMINI-North Telescope (8m) covering 7.5 ~ 13.2㎛. The prominent broad emissions appear at 7.7㎛, 8.6㎛ and 11.3㎛ wavelength along with the strong NeII 12.8㎛ line. Those three emissions are unidentified yet, but PAH molecules and their derivatives are likely to be candidates. In order to help to identify these features, we probe into infrared emissions at high angular resolution and to analyse their dependences on location in the nebula of the strengths and profile shape. We investigate 1) the relative band intensity ratio and profile shape, 2) the degree of asymmetry for the 11.3㎛ feature and 3) a puzzling 12㎛ broad continua as a function of the distance from the central star. Specific PAH candidates along spatial distribution will be discussed.

[IM-03] Statistical Properties of the diffuse far-ultraviolet continuum radiation

Kwangil Seon

Korea Astronomy and Space Science Institute

The far-ultraviolet (FUV) continuum background at the wavelength longer than Lyα has been extensively observed (e.g., with FIMS), but the observations at the band shortward of Lyα have been scarce. The diffuse FUV radiation longward of Lyα is generally believed to correlates with the dust 100 μm emission. However, it has been known that the diffuse FUV radiation shortward of Lyα shows a weak correlation with the 100 μm emission, but shows large variations, probably due to differences in the local radiation field. We reexamine observations of the diffuse FUV radiation by the FUSE (Far Ultraviolet Spectroscopic Explorer) to investigate a correlation between the diffuse FUV radiation shortward of Lyα and 100 μm emission. We find that the quantities show a better correlation in the logarithmic scale than in the linear scale.

[IM-04] AKARI near-infrared spectra toward shock-cloud interaction regions of two supernova remnants HB21 and IC443

Jong-Ho Shinn[1], Bon-Chul Koo[1], and Ho-Gyu Lee[2]

[1]Department of Physics and Astronomy, Seoul National University, [2]Department of Astronomy, University of Tokyo