[구IGR-06] High Resolution Near Infrared Spectrum of NGC 7023

Huynh Anh N. Le[1], Soojong Pak[1], Hye-In Lee[1], Jae-Joon Lee[2]
Quang Nguyen-Luong[3], Kyle Kaplan[4], Daniel T. Jaffe[4]
[1]*School of Space Research, Kyung Hee University*
[2]*Korea Astronomy and Space Science Institute*
[3]*The Canadian Institute for Theoretical Astrophysics (CITA), University of Toronto*
[4]*Department of Astronomy, the University of Texas at Austin*

The reflection nebula NGC 7023 is a typical example of a photodissociation region (PDR), which consists of high density molecular gas that is exposed to an intense UV radiation field. The source of the UV photons in NGC 7023 is the young pre-main-sequence Be star HD 200755. We present our near-infrared high-resolution (R ~ 40,000) spectrum of NGC 7023, covering a region of 1 x 15 arcseconds, observed during the commissioning runs of IGRINS (Immersion GRating near-INfrared Spectrometer). The spectrum shows many strong narrow emission lines that arise from the molecular rovibrational transitions of H2. From the intensity ratios between these H2 lines, we investigate physical conditions within the PDR such as the temperature, density, and pressure. The high spectral resolution of IGRINS allows us to resolve the velocity field of the PDR. In addition, we compare the IGRINS spectrum to Cloudy PDR model.

[구IGR-07] High resolution Infrared spectroscopy of Planetary Nebula with IGRINS

Young Sam Yu and KASI-UTIGRINSTeam
Korea Astronomy and Space Science Institute

Planetary nebulae (PN) are the last stages of evolution of intermediate mass (1-8 Msolar) stars. Their shapes are thought to result from interactions between the present-day, fast (emerging white dwarf) and previously ejected, slow (red giant) stellar winds.

The observation of young, bright PN, NGC7027 and BD+30 3639, was made on July 7, 2014 using the 2.7m Harlan J. Smith telescope at the McDonald Observatory. IGRINS with high spatial (0.27") and high spectral (7.5km s^{-1}) resolution will provide more nebular lines and excitation/abundances to constrain the morphology and kinematics of the Nebula and the PDRs. Combined with other archival data (X-ray, 2MASS, WISE, Spitzer, Herschel) for PN, high-resolution IR spectroscopy will yield insight into poorly understood aspects of PN morphologies and the late stages of binary star evolution.