## [구IM-01] Near-infrared Spectroscopy of Iron Knots in Cassiopeia A Supernova Remnant

Yong-Hyun Lee[1], Bon-Chul Koo[1], Dae-Sik Moon[2]
[1]*Department of Physics and Astronomy, Seoul National University,*
[2]*Department of Astronomy and Astrophysics, University of Toronto*

Cassiopeia A supernova remnant is a young (~330 yr) remnant of Type IIb SN explosion with a massive progenitor. It shows two distinct optical knots; fast moving ejecta knots (FMKs) and quasi stationary circumstellar knots (QSFs). These knots offer an unique opportunity to explore the details of the explosion and also the end state evolution of the Type IIb SN progenitor.

We have obtained NIR long-slit (30″) spectra of 7 positions around the bright rim of Cas A in [Fe II] 1.644 micron using Triplespec which is a cross-dispersed near-infrared spectrograph that provides continuous wavelength coverage from 0.95-2.46um at intermediate resolution of 2700. Most of the FMKs show strong sulfur, silicon, and iron forbidden lines but no hydrogen or helium lines. The QSFs, on the other hand, show a much richer spectrum with strong hydrogen, helium, and iron lines, but no sulfur and silicon lines. We measure their fluxes and radial velocities, and derive their physical parameters such as electron density and temperature. We also measure the proper motion of these knots from two [Fe II] 1.644 micron images obtained at 3-year interval. We analyze the physical properties of these knots and discuss the evolution and explosion of the progenitor of Cas A.

## [구IM-02] Shell Candidates from I-GALFA HI Survey

Geumsook Park and Bon-Chul Koo
*Seoul National University*

Diffuse interstellar atomic hydrogen (HI) gases are easily shaped into shell-like features by energetic processes such as stellar winds and supernova explosions. The physical characteristics and the Galactic distribution of HI shells and shell-like structures, therefore, are closely related to those of the energy sources. Recently, Inner-Galaxy Arecibo L-band Feed Array (I-GALFA) low-latitude HI survey has been completed. I-GALFA HI survey covers the central part of the first quadrant ($31° \lesssim l \lesssim 77°$ at $b = 0°$, $|b| \lesssim 12°$) with spatial and velocity resolutions of 3.35′ and 0.184 km/s, respectively. The high-angular and high-velocity resolutions enable in-depth investigation of HI shells including the ones of smaller angular sizes. We have found 36 shell candidates with the naked eye. Their angular sizes are distributed from ~0.4° to ~12°. About sixteen of them appear to be expanding. We examine associated features at other wavebands and discuss their origin.