[구IM-07] Near-infrared studies of iron knots in Cassiopeia A supernova remnant: I. Spectral classification using principal component analysis

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We have been carrying out near-infrared (NIR) spectroscopy as well as [Fe II] narrow band imaging observations of Cassiopeia A supernova remnant (SNR). In this presentation, we describe the spectral classification of the iron knots around the SNR. From eight long-slit spectroscopic observations for the iron-bright shell, we identified a total of 61 iron knots making use of a clump-finding algorithm, and performed principal component analysis in an attempt to spectrally classify the iron knots. Three major components have emerged from the analysis; (1) Iron-rich, (2) Helium-rich, and (3) Sulfur-rich groups. The Helium-rich knots have low radial velocities ($|v_r| < 100$ km/s) and radiate strong He I and [Fe II] lines, that match well with Quasi-Stationary Flocculi (QSFs) of circumstellar medium, while the Sulfur-rich knots show strong lines of oxygen burning materials with large radial velocity up to +2000 km/s, which imply that they are supernova ejecta (i.e. Fast-Moving Knots). The Iron-rich knots have intermediate characteristics; large velocity with QSF-like spectra. We suggest that the Iron-rich knots are missing "pure" iron materials ejected from the inner most region of the progenitor and now encountering the reverse shock.

[포IM-08] TRAO Outer Galaxy Surey in ^{13}CO I

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We present a result of ^{13}CO(1-0) survey toward the Outer Galactic Plane using the multi-beam receiver system recently installed on the 14 m telescope at Taeduk Radio Astronomy Observatory(TRAO). Our target region is from l=120° to 133° and b=-1° to +1°, and some extended regions are included where emission is still arising. All data are on 50″ grid. Velocity resolution is 0.63 km/sec, and the total velocity range is from -150 km/sec to 100 km/sec. A total of 140,000 spectra were obtained. The rms noise is about 0.18 K per channel for unsmoothed raw data. We will present a few initial results of the survey database.