[구 IM-03] IGRINS NIR Spectroscopy of Diffuse Sources around MWC 1080

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We found a diffuse Hα feature with a large size of ~2′ around a Herbig star, MWC 1080. It shows a strong correlation with the elongated outflow cavity centered on the star. To investigate the diffuse Hα source and the molecular cavity in detail, we carried out the high-resolution NIR spectroscopy using IGRINS. We detected six hydrogen Brackett line series, seven H2 lines, and an [Fe II] forbidden line. With the obtained spatial, kinematic, and line ratio results, we discuss the characteristics of the central MWC 1080A, the NE outflow cavity, and the SE molecular cloud regions separately.

Most of the bright Brγ sources around MWC 1080A were found to be reflection nebulae, but a point-like Brγ source close to another young star, MWC 1080E, was identified as a distinct source due to MWC 1080E itself. The narrow components of the H2 lines observed around MWC 1080A were found to trace PDRs located on the wall of the main outflow cavity. Based on the shock-excited H2 and [Fe II] lines detected just inside a bow-shock shape Hα feature, we suggest that it represents the actual shock at the head of the NE outflow from MWC 1080A. Also, we newly detected the shock-excited H2 and [Fe II] lines with highly blueshifted velocities in the SE molecular cloud region. They could be related to unrevealed outflows from other young stars existing around MWC 1080A.

[구 IM-04] Dust scattering simulation of far-ultraviolet light in the Milky Way

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Light from universe is absorbed, scattered, and re-released by interstellar dust before it reaches us. Therefore, accurate correction of the observed light requires not only spatial distribution of interstellar dust, but also information on absorption and scattering for each wavelength. Far-ultraviolet (FUV) light is mainly produced by bright, young O-type and some B-type stars, but it is also observed in interstellar space without these stars. Called FUV Galactic light (DGL), these lights are mostly known as starlight scattered by interstellar dust. With the recent release of GAIA DR2, not only accurate distance information of stars in our Galaxy, but also accurate three-dimensional distribution maps of interstellar dust of our Galaxy were produced. Based on this, we performed 3-dimensional Monte Carlo dust scattering radiative transfer simulations for FUV light to obtain dust scattered FUV images and compared them with the observed FUV image obtained by FIMS and GALEX. From this, we find the scattering properties of interstellar dust in our Galaxy and suggest the intensity of extragalactic background light. These results are expected to aid in the study of chemical composition, size distribution, shape, and alignment of interstellar dust in our Galaxy.

[구 IM-05] Submillimeter continuum variability in Planck Galactic cold clumps using the JCMT-SCOPE survey

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In the early stages of star formation, a protostar is deeply embedded in an optically thick envelope such that it is not directly observable. Variations in the protostellar accretion rate, however, will cause luminosity changes that are reprocessed by the surrounding envelope and are observable at submillimeter wavelengths. We searched for submillimeter flux variability toward 12 Planck Galactic Cold Clumps detected by the James Clerk Maxwell Telescope (JCMT)-SCUBA-2 Continuum Observations of Pre-protostellar Evolution (SCOPE) survey. These observations were conducted at 850 μm using the JCMT/SCUBA-2. Each field was observed three times over about 14 months between 2016 April and 2017 June. We applied a relative flux calibration and achieved a calibration uncertainty of ~3.6% on average. We identified 136 clumps across 12 fields and detected four sources with flux variations of ~30%. For three of these sources, the variations appear to be primarily due to large-scale contamination, leaving one plausible candidate.

[구 IM-06] How Supernovae Ejecta Is Transported In A Galaxy: DependenceOn