A 3D map around the candidate high mass young stellar object IRAS 18264-1152

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Understanding whether intermediate and high mass stars form by disk accretion, like low mass stars, remains one of the key subjects of star formation research. With the goal of exploring the nature of outflows from high mass young stellar object (HMYSO) candidates, and their physical properties compared with those from low mass YSOs, we carried out a wide, shallow narrow-band imaging survey of 50 HMYSO candidates (Varricatt et al 2010). Observing in the v=1-0 S(1) line of H_2, we detected highly collimated outflows associated with 50% of the candidates showing that this signature of disk accretion is commonly detected in regions of high mass star formation. A tentative association of the outflows to the near-infrared counterparts of the HMYSOs was made. However, in such a complex region, the precise association of outflows to their driving sources is challenging. Follow-up spectroscopy is typically required to establish firmly the link from source to outflow and to characterise the mass loss rates, kinematics and excitation conditions in the flows.

We have recently pioneered a new technique to survey star formation regions using wide-field integral field spectroscopy with the K-band Multi Object Spectrograph (KMOS) on the ESO Very Large Telescope. Using a mosaic mode of this instrument, a 1 square-arcminute region around IRAS 18264-1152 was surveyed in the K-band with seeing-limited spatial resolution. These observations allow us to study the region on size scales from ~1pc to 60pc and with velocity resolution of 75km/s. The immediate result is an improved census of the outflows in the region, with the detailed the kinematics of the flows showing a single dominant outflow associated with the central cluster. The excitation of H_2 (whether from shocks or from UV radiation from the forming star) is measured across the whole region using the detected emission lines from the v=1, v=2 and v=3 vibration levels, leading to an improved estimate of the gas temperature and the column density of H_2. Spectra of all the stellar sources in the region are obtained and the accreting sources in the region have been positively identified using the Brackett gamma line of HI and identified with the corresponding sources from SPITZER and other long wavelength surveys. A complete picture of the balance of accretion and outflow in the region is thus obtained.

We will present the results for IRAS 18264-1152 and demonstrate the potential of the wide-field IFU mode of KMOS for the study of star formation regions.