P119a ALMA observation of 70 μm dark high-mass clump G23.477

森井嘉穂 (東京大学/国立天文台), 中村文隆, Patricio Sanhueza(国立天文台/SOKENDAI), 大橋聡史 (理研), 立松健一 (国立天文台/NRO/SOKENDAI)

Investigating massive infrared dark clouds allows to constrain the initial conditions of high-mass star formation. As a case study, we investigate the structure of a 70 μm dark high-mass clump G23.477 (d $\sim$ 4.9 kpc). This clump is a high-mass prestellar clump candidate, and Beuther et al. (2015) identified 4 prestellar core candidates with PdBI. To further gain knowledge of the early phases of high-mass star formation, we observed this clump using ALMA Band-6 dust continuum, CO/SiO outflow emission and N_2D^+ emission at an angular resolution of $1''.2$. Our ALMA observations are consistent with Beuther et al.'s results, but our higher sensitivity ALMA observations allow us to identify more cores and reveal that some of them are actually protostellar. In total, we identified 3 protostellar cores and 3 prestellar cores. The core masses are estimated to be between 1$-$12 $M_\odot$. In addition, we detect two collimated bipolar outflows and one monopolar outflow. For the first time, our observations have revealed star formation activity in this clump. The position-velocity diagrams indicate that the outflows contain several knots and can be categorized into the Hubble wedge type. In other words, the outflows are likely to originate from episodic mass ejection. The massive core ($\sim$ 9.5 $M_\odot$), which is dark even in 100 μm, has relatively strong N_2D^+ emission and detected no molecular outflow. It is worth investigating its detailed characteristics to understand how high-mass stars form.