P131a ALMA View of Molecular Outflow in Elias 29

Eri Saiga, Yoko Oya (U. Tokyo), Anna Miotello (ESO), Cecilia Ceccarelli (IPAG), Claudio Codella (Arcetri), Claire Chandler (NRAO), Nami Sakai (RIKEN), Satoshi Yamamoto (U. Tokyo), and FAUST Team Members

Elias 29 is a low-mass Class I protostar in the ρ-Ophiuchi molecular cloud complex. With molecular line observations with ALMA, Oya et al. (2018) revealed a compact component ($\sim$50 au) associated to the protostar and a southern ridge component apart from the protostar by 500 au. In the ALMA FAUST program, we tentatively identified an outflow cavity feature in the $C^{18}O$ and SO emission in the southeastern part and suggested an interaction between the outflow and the southern ridge. In addition, we found a bow shock at the eastern side of the protostar in the SO emission, which would be caused by a protostellar jet.

To further characterize the complex physical structures of this source, we here investigate the outflow structure in detail by using the $C^{18}O$ and SO data observed in the FAUST program. We carefully CLEAN the images to recover the extended emission as much as possible. As the result, we successfully find the northwestern counterpart of the outflow cavity in the $C^{18}O$ emission. The position-velocity diagrams along the line perpendicular to the outflow axis reveal an expanding structure specific to the outflow. From these results, we definitively identify the outflow in the vicinity of this protostar. Since significant velocity gradient is not seen along the outflow axis, the outflow likely blows almost on the plane of the sky. Detailed comparison of the observed structure with the parabolic outflow model is in progress.