

P103a Star Formation Feedback to a Parent Cloud: The Elias 29 Case

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. Recently, Oya et al. (2018) revealed physical and chemical structures within this source with ALMA observations. A compact component (~ 50 au) associated to the protostar is abundant in SO and SO₂, while deficient in CS and organic molecules. On the other hand, a southern ridge component apart from the protostar by 500 au is mainly traced by CS. Due to these interesting features, this source is involved in the ALMA large program FAUST (Fifty AU SStudy of the chemistry in the disk/envelope system of Solar-like protostars).

To further explore these features, we have studied an outflow/jet around the protostar and the star formation feedback to a parent cloud by using the chemical diagnostic power of FAUST. Main results are as follows. (1) We identified an outflow cavity in the C¹⁸O and SO emission. This is the first high-resolution image of the outflow in the vicinity of the protostar. (2) We revealed a bow shock at the eastern side of the protostar in the SO emission, which would be caused by a protostellar jet. (3) We found a relatively low DCO⁺/HCO⁺ ratio in the southern ridge. In particular, the ratio is as low as 0.0024 at the interaction position between the outflow and the southern ridge. Thus, the outflow interaction may contribute to the low ratio.

This study demonstrates a small-scale (~ 100 au scale) dynamic interaction between the Class I outflow/jet structure and the surrounding cloud material, i.e., the southern ridge.