Chemical, morphological and dynamical study of circumstellar material in AB Aur.

Pablo Rivière-Marichalar[1], Asunción Fuente[1], Clément Baruteau[2], Roberto Neri[3], Sandra P. Treviño-Morales[4], David G. Navarro[1]

[1] *Observatorio Astronómico Nacional (OAN, IGN), calle Alfonso XII 3, E-28014 Madrid, Spain*

[2]*CNRS / Institut de Recherche en Astrophysique et Planétologie, 14, avenue Edouard Belin, F-31400 Toulouse, France*

[3]*Institut de Radioastronomie Milimétrique, 300 rue de la Piscine, F-38406 Saint Martind'Héres, France*

[4]*Dept. Of Space, Earth and Environment, Chalmers University of Technology, Onsala Space Observatory, SE-439 92, Onsala, Sweden*

AB Aur is a well known HAe star harboring a prototypical transition disk. A series of features have been observed in the disk, all of them likely indicative of planet formation processes. Such features include spiral arms [1], a dust cavity [2], and a dust trap [3]. We have studied in detail the chemistry of the protoplanetary disk by means of interferometric (NOEMA and ALMA) and single dish (IRAM-30m) observations of the continuum and of different molecular species, such as CO, ^{13}CO, C^{18}O, HCO$^+$, HCN, H_2CO, CS, CN, and SO. These observations have revealed important information about the disk, where chemical segregation is observed in both the radial and azimuthal directions. A particularly interesting result is the detection of an HCO$^+$ filament that connects the outer disk with the innermost [4]. We interpreted this filament as an accretion flow crossing the cavity. This feature has not been detected in our recent NOEMA run observations of CO, ^{13}CO, C^{18}O, H_2CO, and SO. This lack of detections points to HCO$^+$ as a good tracer of the innermost regions of the disk. We propose to present our results on this very interesting object, which are based on IRAM observatories, and have been published as a series of letters and papers in A&A and APJ.

References

[1] Tang et al. 2012, A&A, 547, A84
[2] Piétu et al. 2005, A&A, 443, 945
[3] Fuente et al. 2017, ApJ, 846, L3
[4] Rivière-Marichalar et al. 2019, ApJ, 879, L14