



# Outflow morphologies in continuum from B228 and B335

Visualizing molecular outflows with CARTA

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# Context on systems B228 and B335

## Details of B335

<b>Source class</b>	<b>Class o</b>
<b>Source mass (solar masses)</b>	<b>[0.05, 0.15]</b>
<b>Distance from Earth (parsecs)</b>	<b>[100, 164.5]</b>

Table 1. General information about Barnard 335 according to Bjerkeli et al, 2023; Sherley et al, 2002 and Hirano et al, 1988.

## Details of B228

<b>Source class</b>	<b>Class o</b>
<b>Source mass (solar masses)</b>	<b>[0.004, 0.007]</b>
<b>Distance from Earth (parsecs)</b>	<b>[155, 156]</b>

Table 2. General information about Barnard 228 according to Bjerkeli et al; 2016; Sherley et al, 2002, and Farideh et al, 2023.



# Current state of research

## Searching for:

- Chronological reports on low mass celestial systems where mass ejection has been suspected due to outflows or winds.
- Algorithms and built-in functions in Python to analyze astronomical data enhancing precision and efficiency.
- Documentation on the physical and mathematical criteria to establish a relation between star formation and molecular outflows.
- Patterns that suggest a confirmation of the hypotheses presented so far in the academic literature about B228 and B335 as young celestial bodies in process of forming stars.

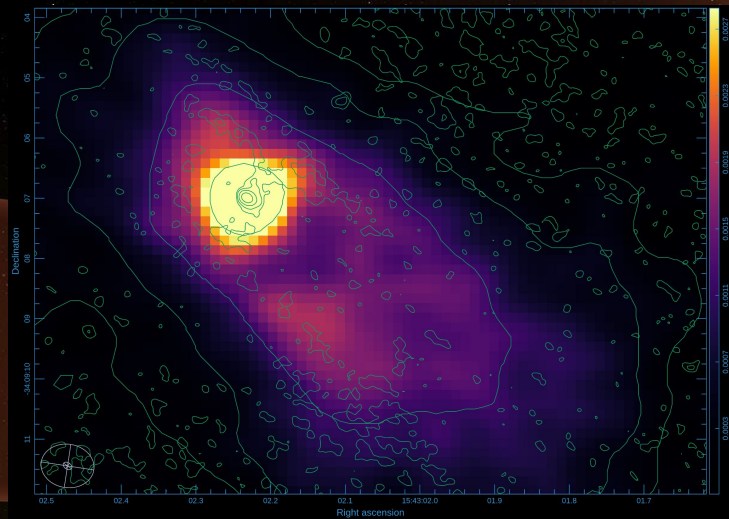


Figure 1. Contour lines of possible molecular outflows from B228 showing an overlap of equal flux lines taken at 0.022 arcsec above equal flux lines taken at 0.16 arcsec.

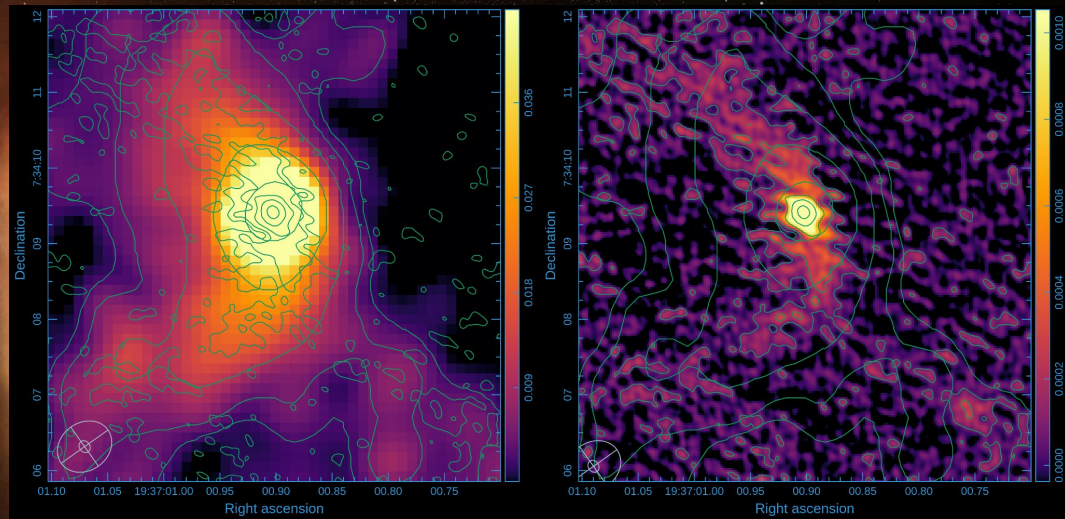


Figure 2. Contour lines of possible molecular outflows from B335 showing an overlap of equal flux lines taken at 0.026 arcsec above equal flux lines taken at 0.13 arcsec of angular resolution.

Contour maps of B228 and B335 4



## Next steps

1. Analyze the observational data from ALMA using Python libraries specialized for astronomical data processing.
2. Compare results obtained with CARTA and Python with those coming from the current state of the art literature.
3. Continue to revise publications on B228 and B335 that confirm outflowing material indicating the shape and direction of the emissions.

# Supporting references as of october 1st

1. Bjerkeli et al (2016). A young bipolar outflow from IRAS 15398-3359.
2. Bjerkeli et al (2019). Kinematics around the B335 protostar down to au scales.
3. Bjerkeli et al (2023). Possible episodic infall towards a compact disk in B335.
4. Farideh et al (2023). The kinematics of the magnetized protostellar core IRAS15398-3359.
5. Frank et al (2014). Jets and Outflows from Star to Cloud: Observations Confront Theory.
6. Hirano et al (1988). Bipolar outflow in B335.
7. Pascucci et al (2022). The Role of Disk Winds in the Evolution and Dispersal of Protoplanetary Disks.
8. Sherley & Evans (2002). Tracing the Mass during Low-Mass Star Formation. III. Models of the Submillimeter Dust Continuum Emission from Class o Protostars.
9. Vazzano et al (2021). Outflows, envelopes, and disks as evolutionary indicators in Lupus young stellar objects.
10. Arce et al (2006). Molecular Outflows in Low- and High-Mass Star Forming Regions.