The early stages at substellar formation in Lupus 1 and 3

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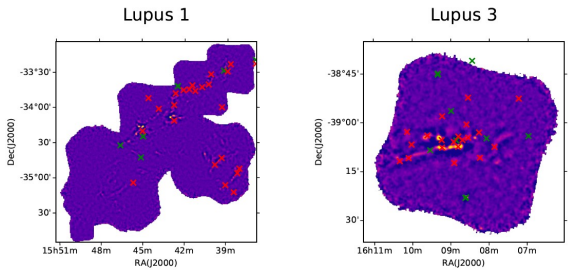
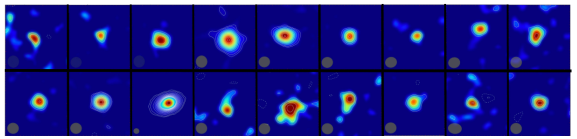
Our **goal** is to understand the dominant formation mechanism of brown dwarfs during the formation stages. Bulk emission is in the sub(mm) regime.
Prior AzTEC/ASTE (1.1 mm) observations to identify possible substellar cores at large scale.



AzTEC/ASTE (1.1 mm)

We identify 64 cores to be observed with ALMA



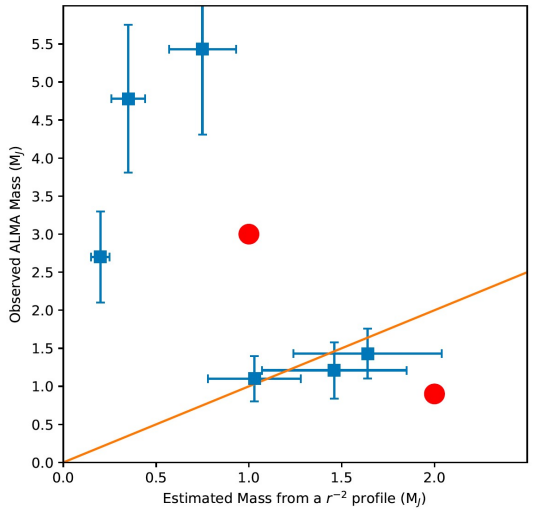
ALMA Band 6 1.3 mm continuum detections

We detected 19 sources. Using the SED, mass and T_{bol}-L_{bol} diagram we classify these sources in:
-12 Presubstellar candidates
-1 Class 0/I candidate
-1 Class I candidate
-5 Class II sources

Presubstellar candidates

1. Bonnor-Ebert isothermal sphere.
At least one of the sources is in gravitational contraction. The remaining sources are not resolved and we can not conclude.

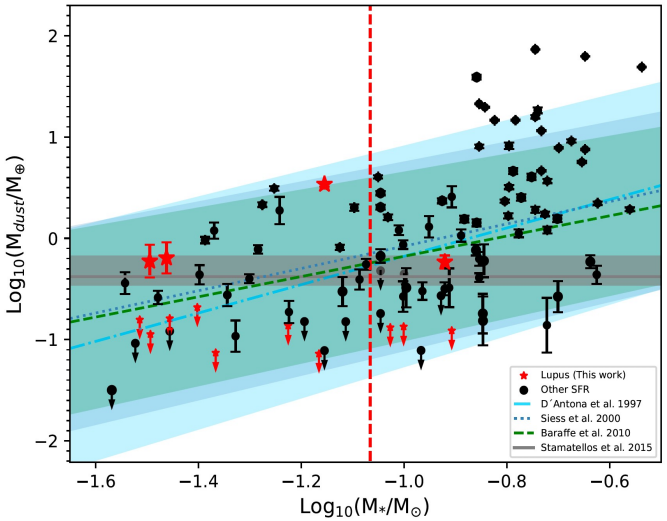
2. We estimated the mass inside the ALMA beam using the AzTEC mass and beam with a r^{-2} density profile. (See figure below)



We conclude that the ALMA detections are the beginning of the large scale-contraction

Class II Brown Dwarfs

We compute the brown dwarf dust disk masses in close star forming regions. We compare these masses with the prediction from disk fragmentation (grey area) and the scaling relations from the stellar regime (blue area)

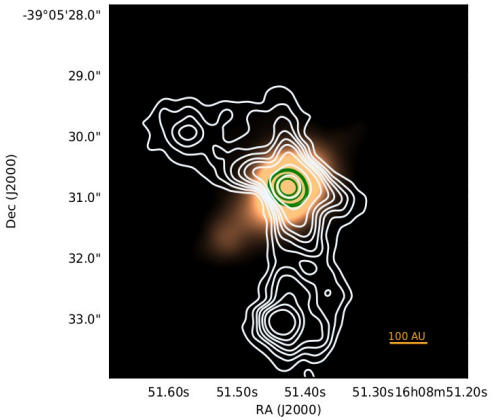


A scaled-down version of low-mass star formation seems to be the dominant formation scenario although it is fair to note that the disk fragmentation may be responsible of a non-negligible number of brown dwarfs

Gas detection

We report the first detection of the base of a bipolar molecular outflow in the sub(mm) regime in a very low mass star. We detected CO(3-2), CO(2-1) and ^{13}CO(3-2) emission lines

We also report a secundary structure perpendicular to the main outflow which nature is still uncertain



White contours represent CO(3-2) emission line. Green contours represent continuum detection. Orange is the [S II] optical jet

Main paper: Santamaría-Miranda et al. 2021 A&A,646, A10, 30
Outflow paper: Santamaría-Miranda et al. 2020 A&A, 640, A13, 16