

Filaments and Feedback

Sümeyye Suri

in collaboration with:

The CARMA-NRO Orion Survey Team and the C+ SQUAD Team

Orion A
Filament Identification
Statistics on Filament Properties
PDR filaments

Filaments in Orion A

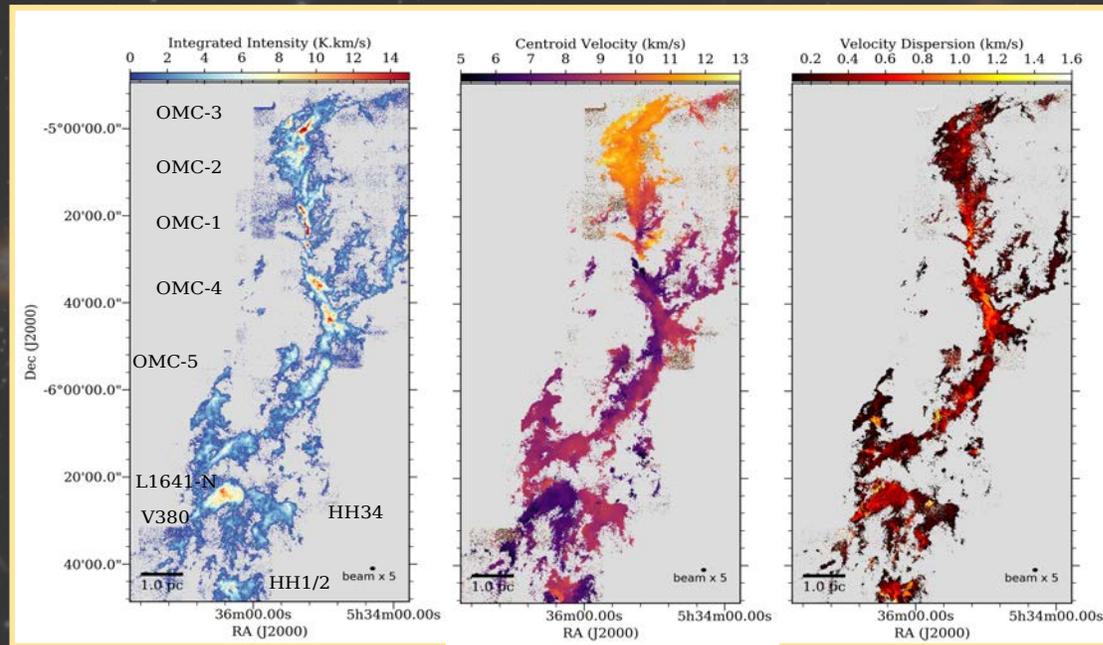


The most nearby high-mass star-forming region (e.g. Kounkel et al 2017;
Grossschedl et al. 2018)
 $10^5 M_{\text{sun}}$
Host to M42, M43, and NGC1977

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Using combined $C^{18}O$ emission

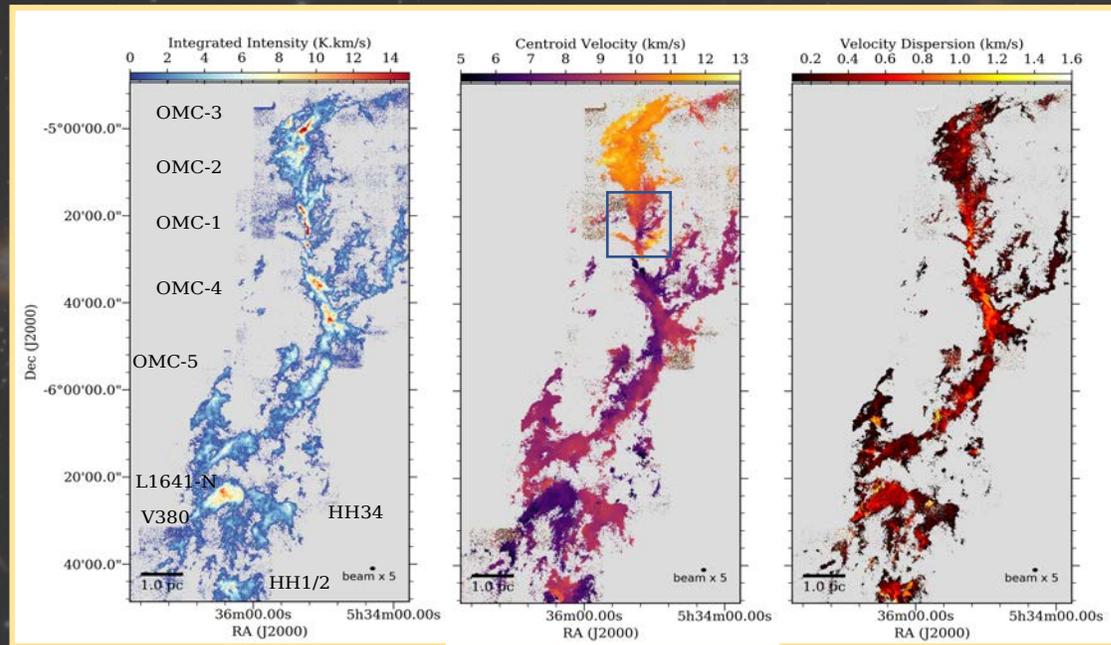


Suri et al. 2019

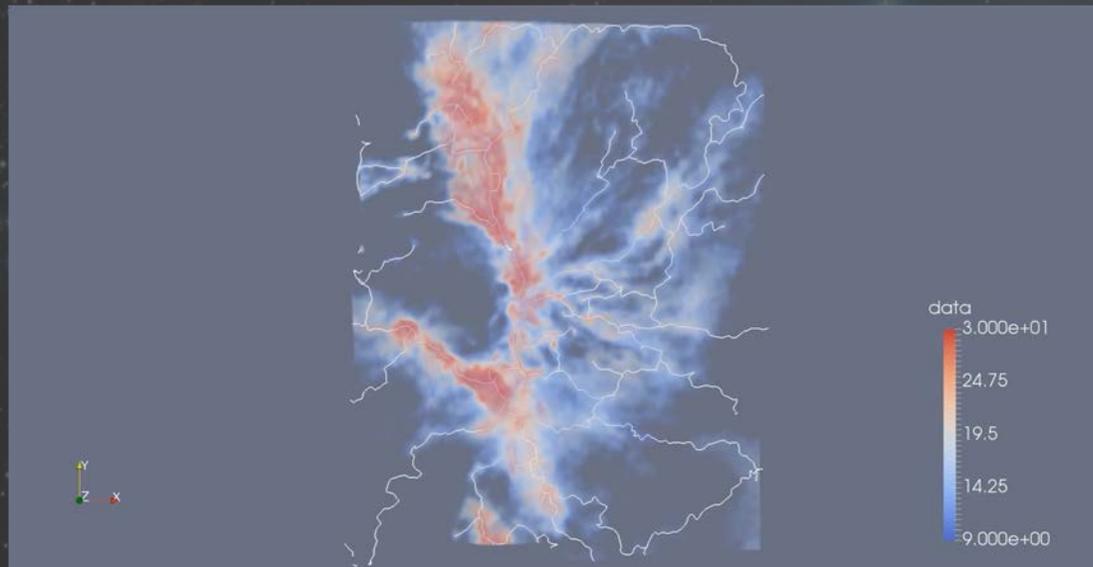
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Using combined $C^{18}O$ emission
 Filament identification with DisPerSE (Sousbie 2011)



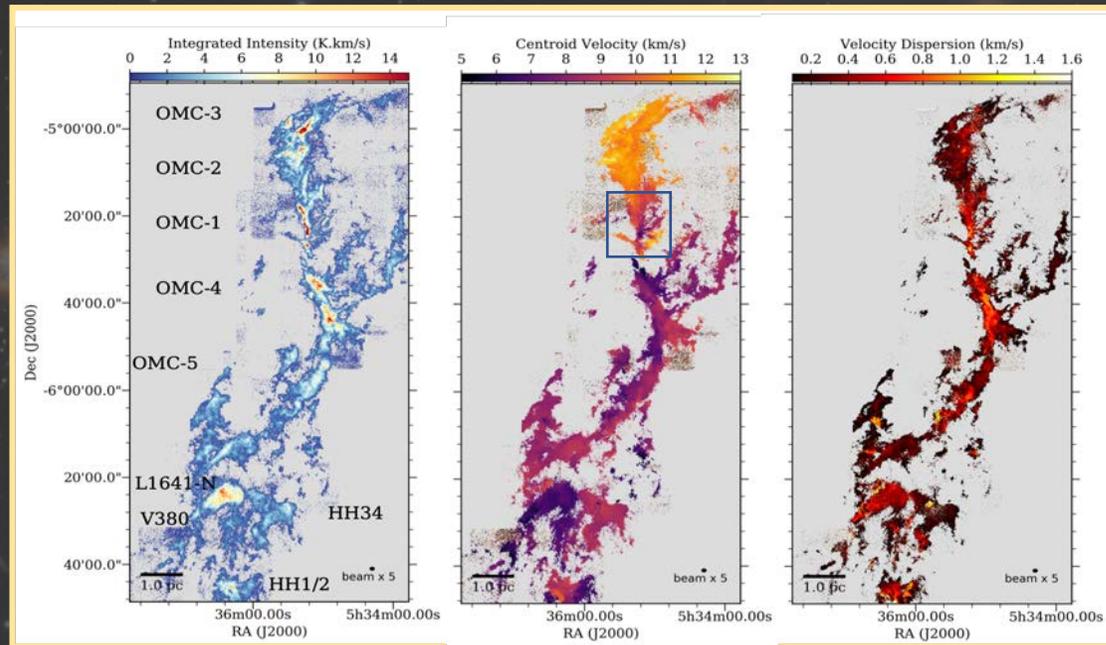
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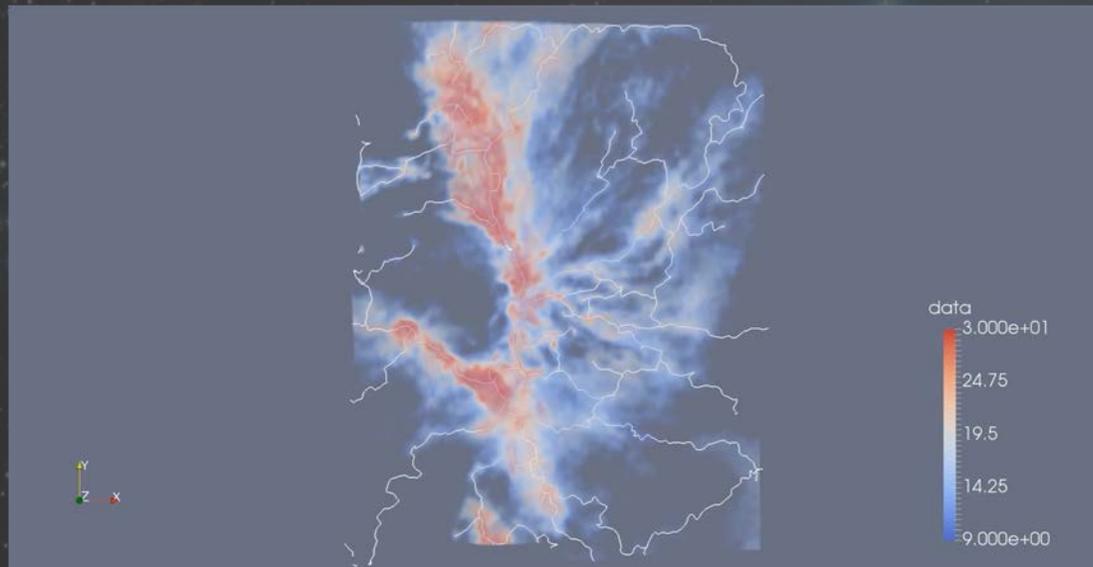
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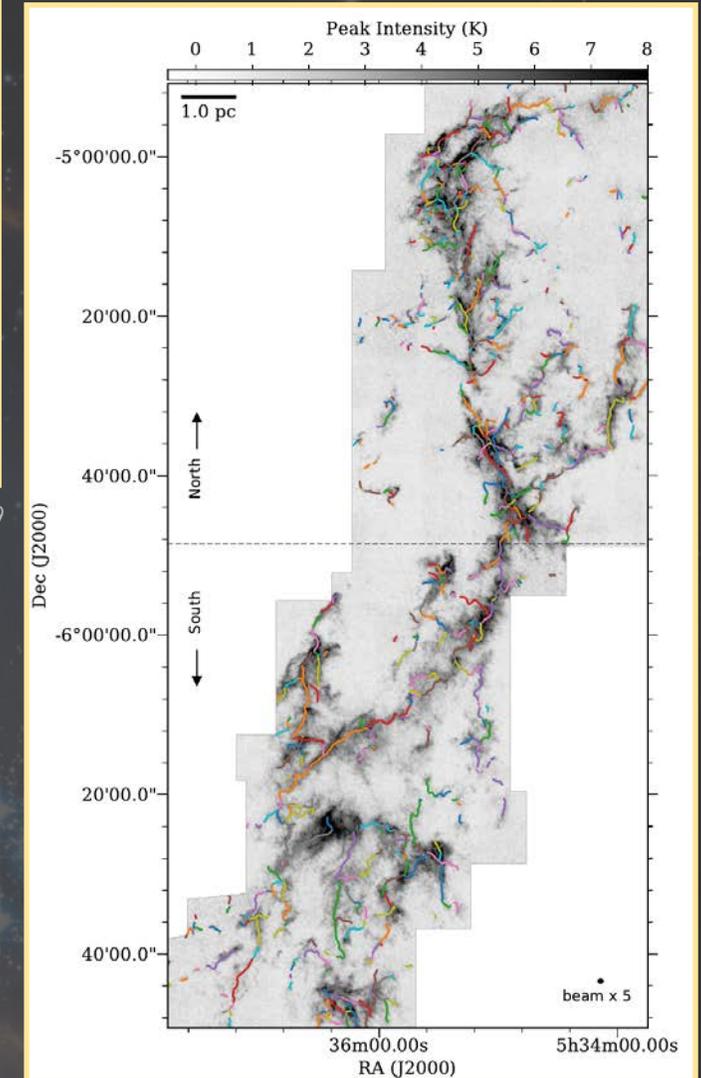
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Suri et al. 2019



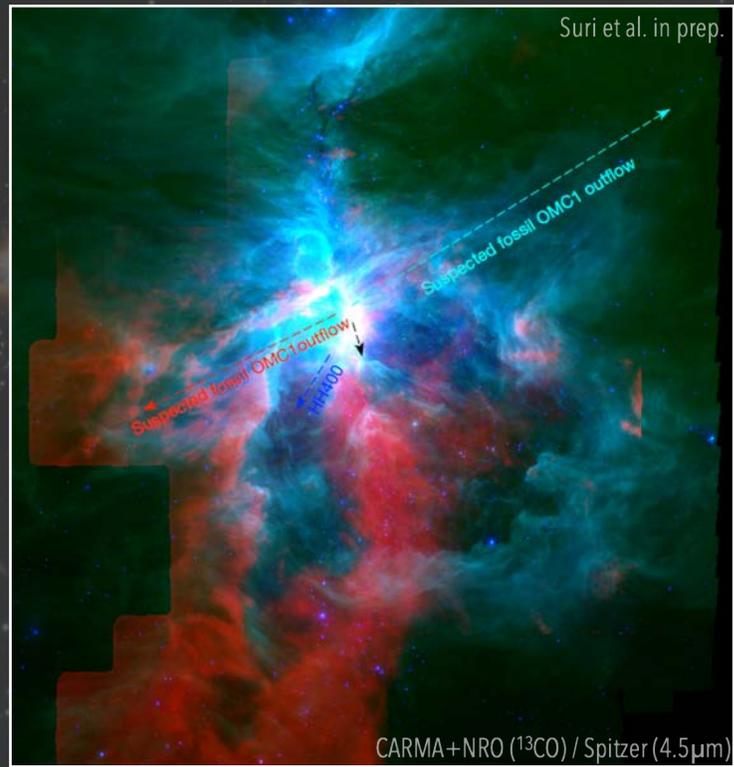
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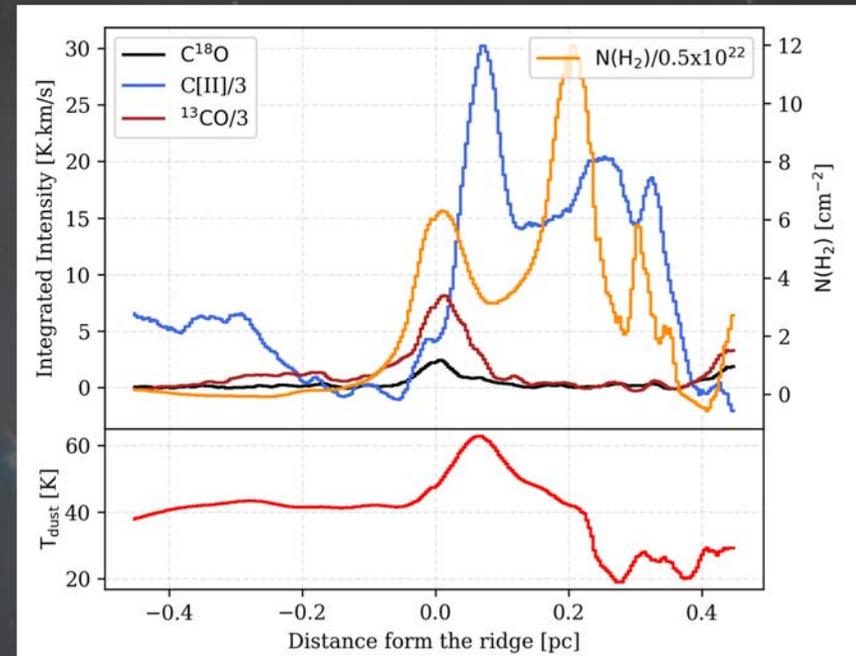
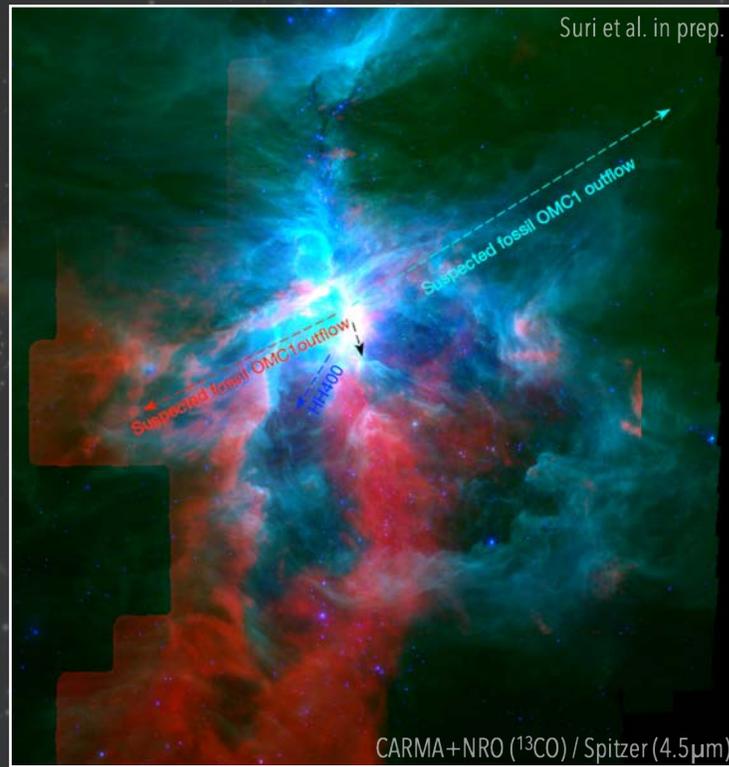
Variation across the cloud
Correlation with the location of hubs and
the amount of substructure
Impacted by stellar feedback!



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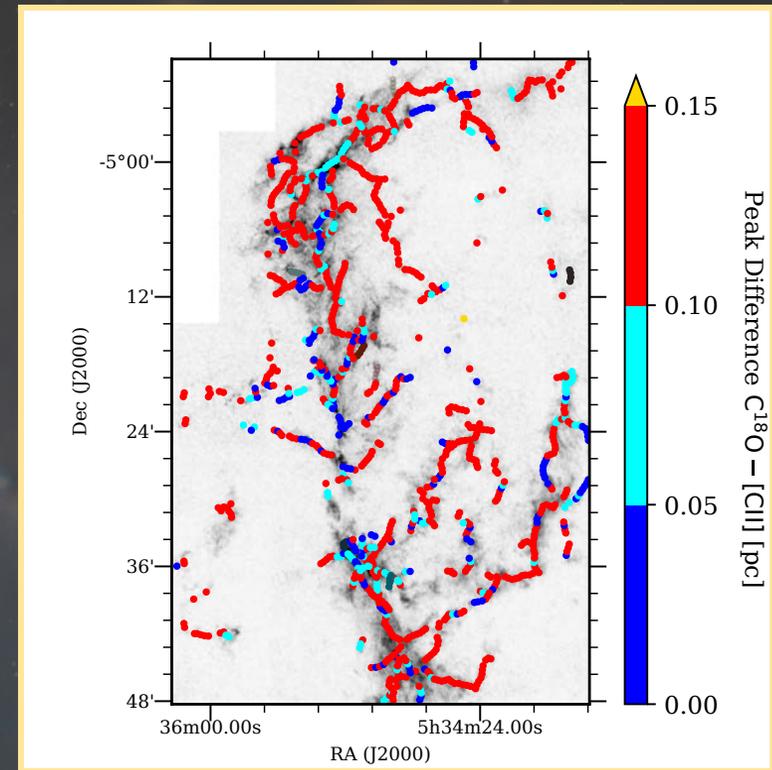
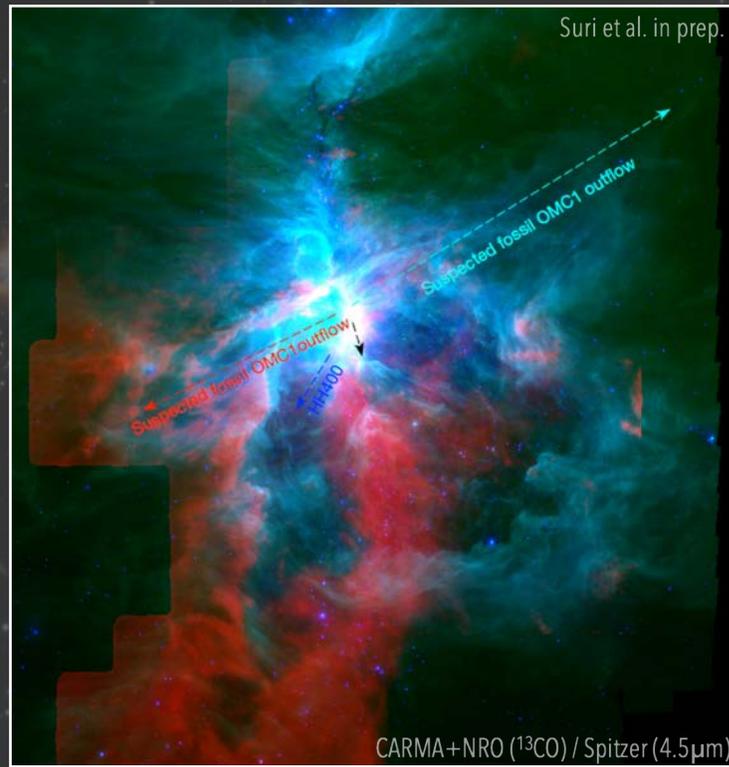
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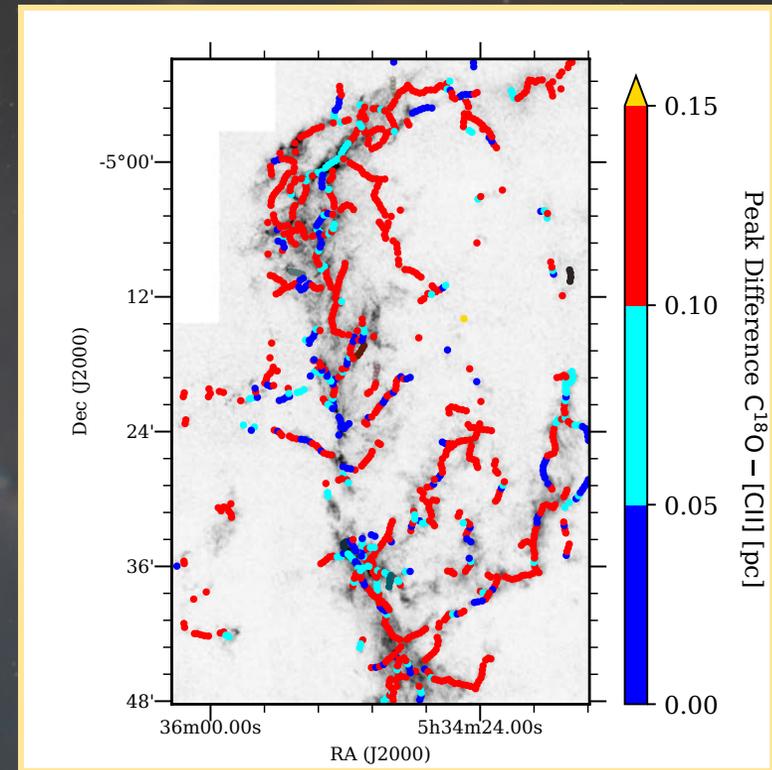
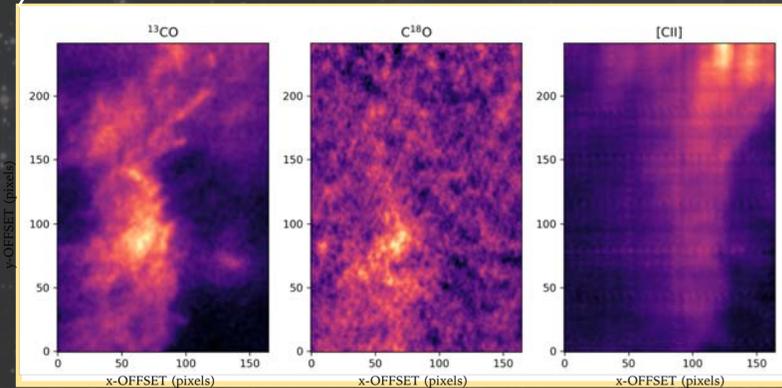
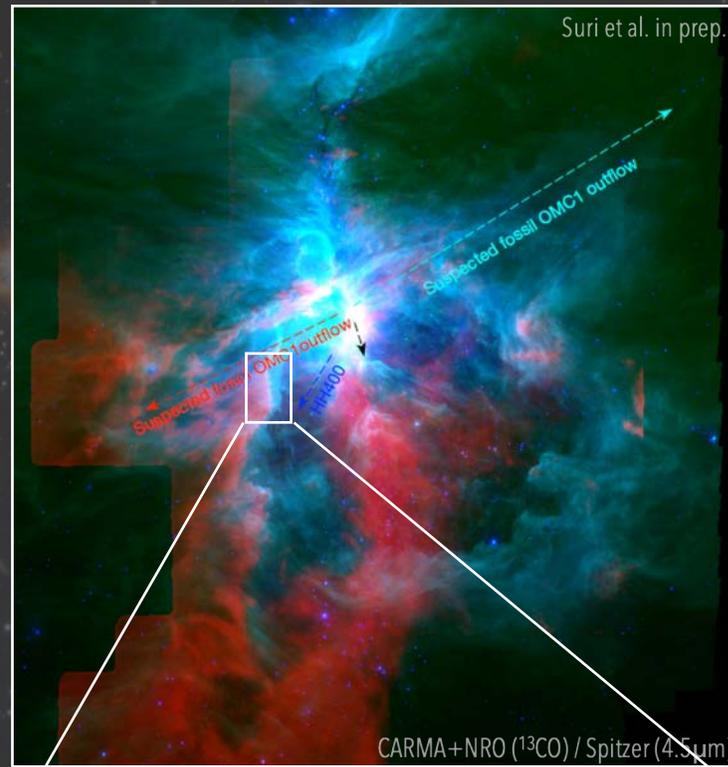
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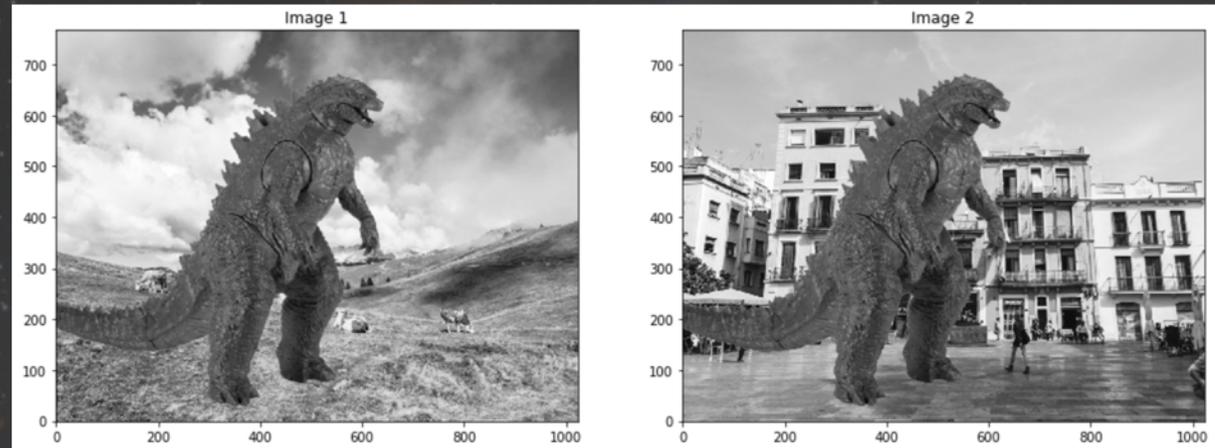
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astroHOG (Soler et al. 2019)

Github: [solerjuan/astrohog](https://github.com/solerjuan/astrohog)

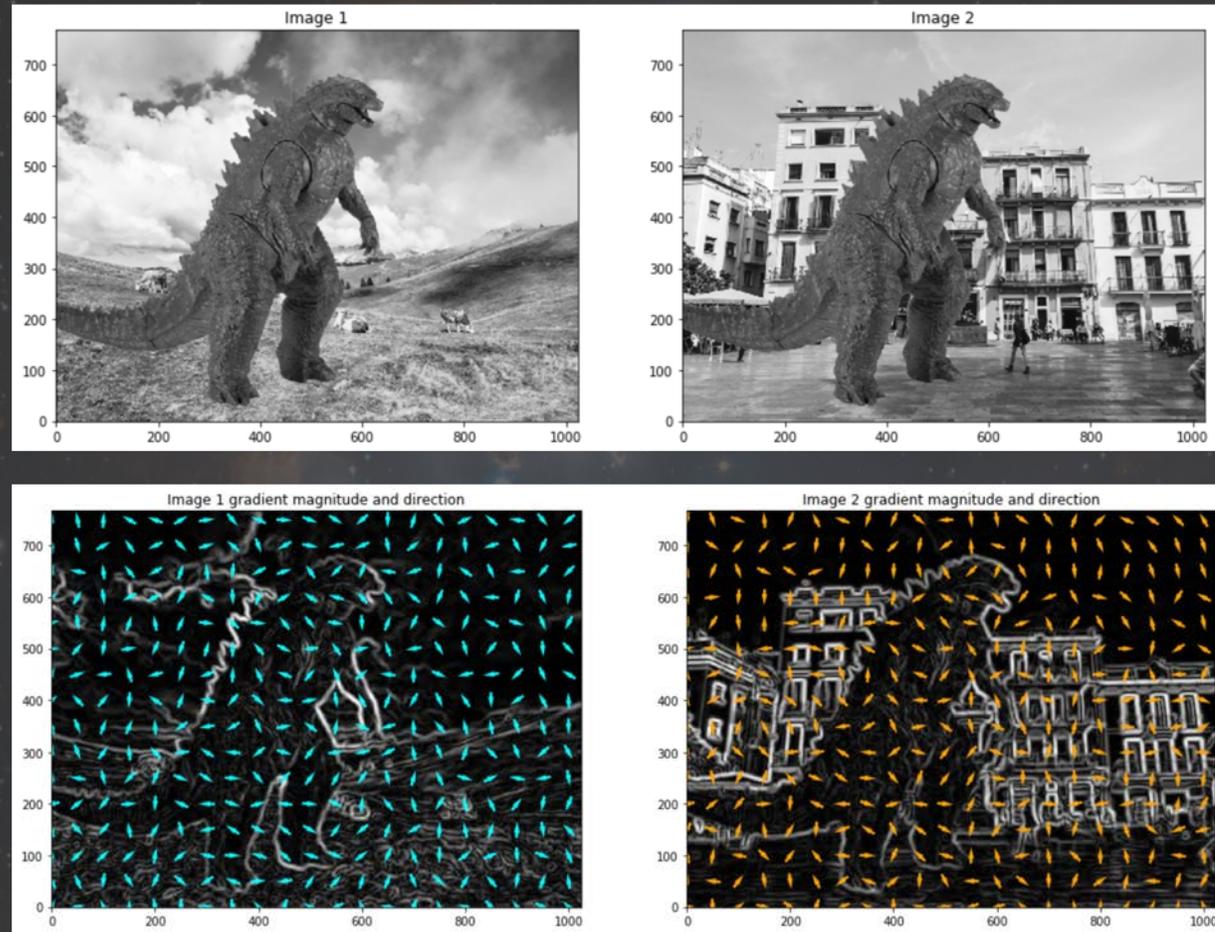


Taken from astroHOG github examples, credit: J. Soler

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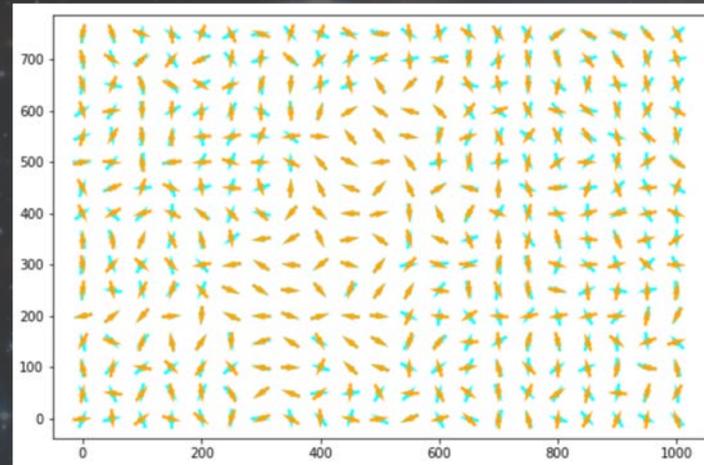
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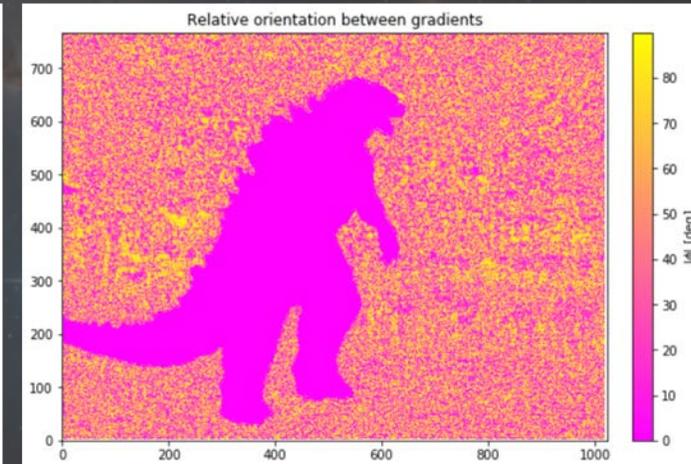
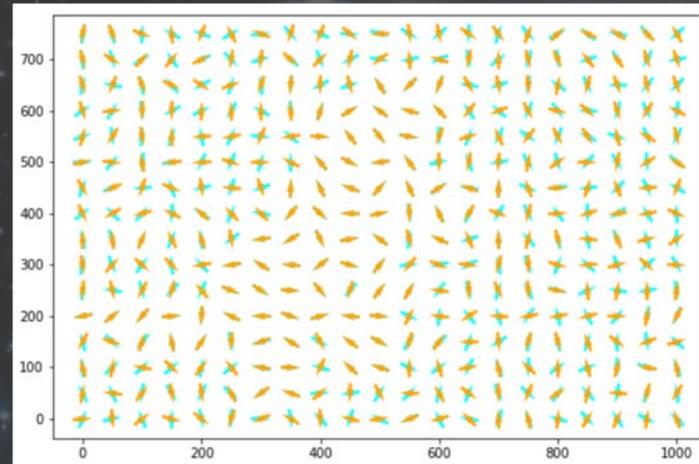
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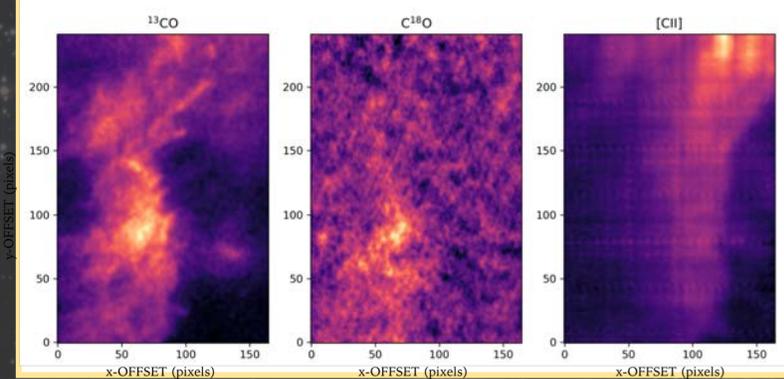
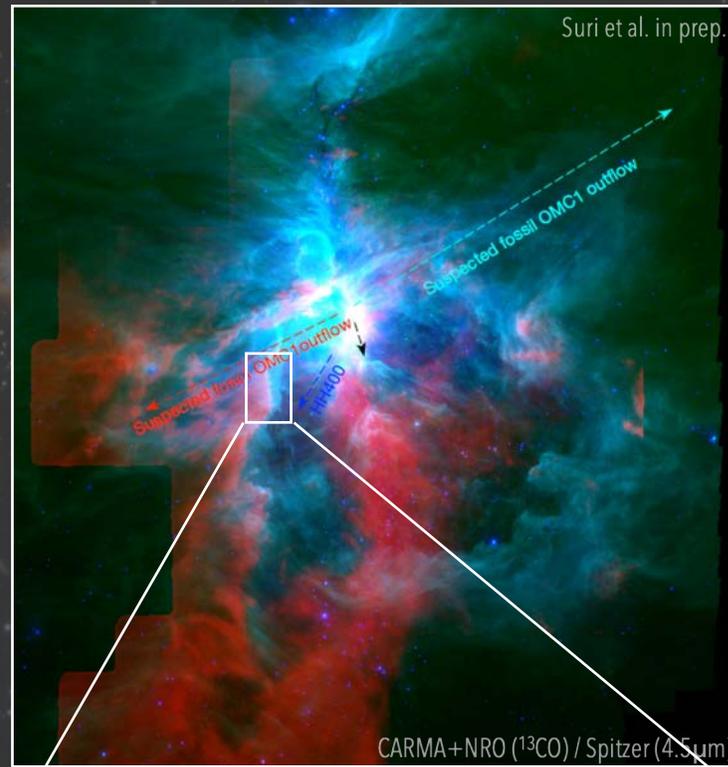


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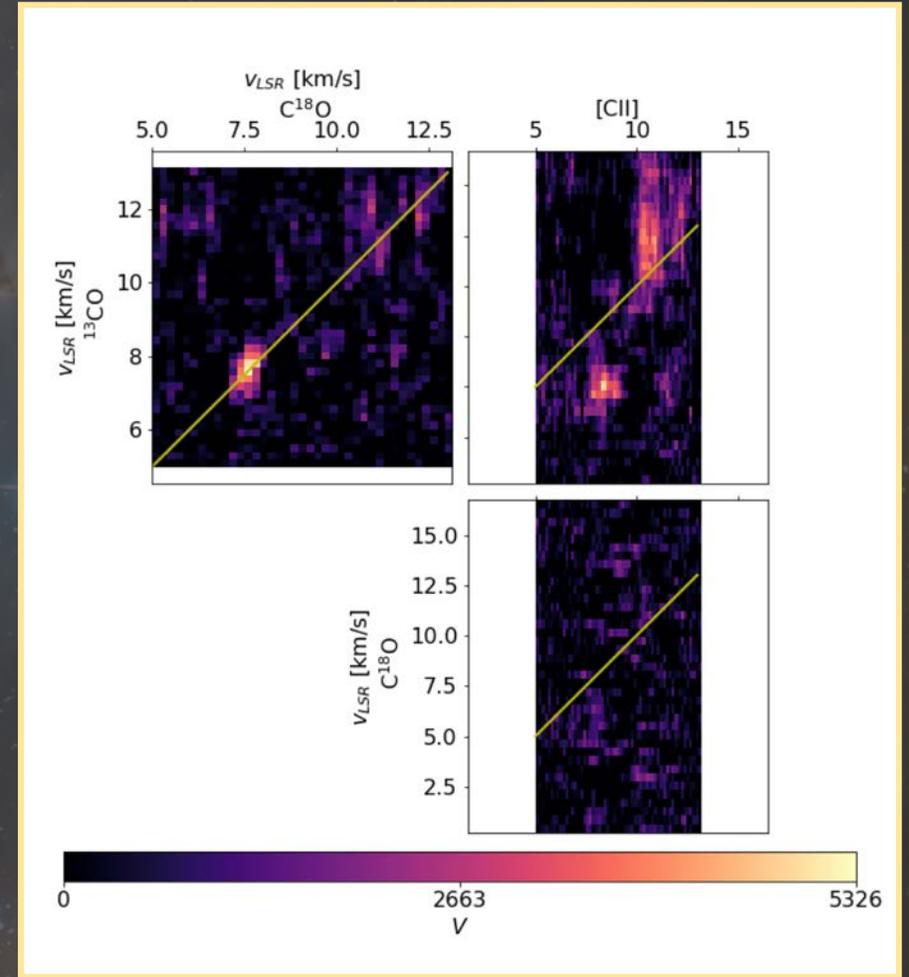
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Using astroHOG:

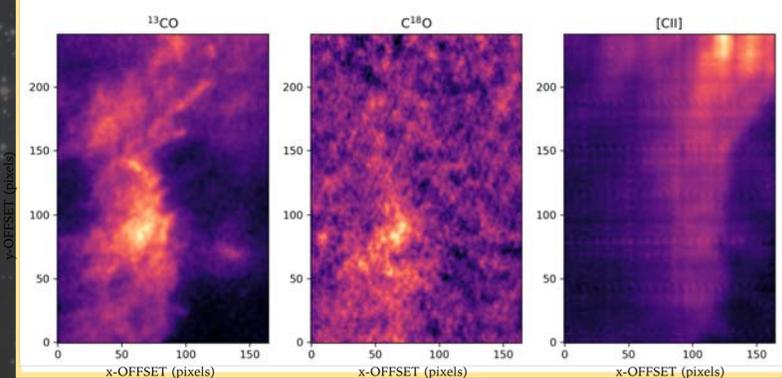
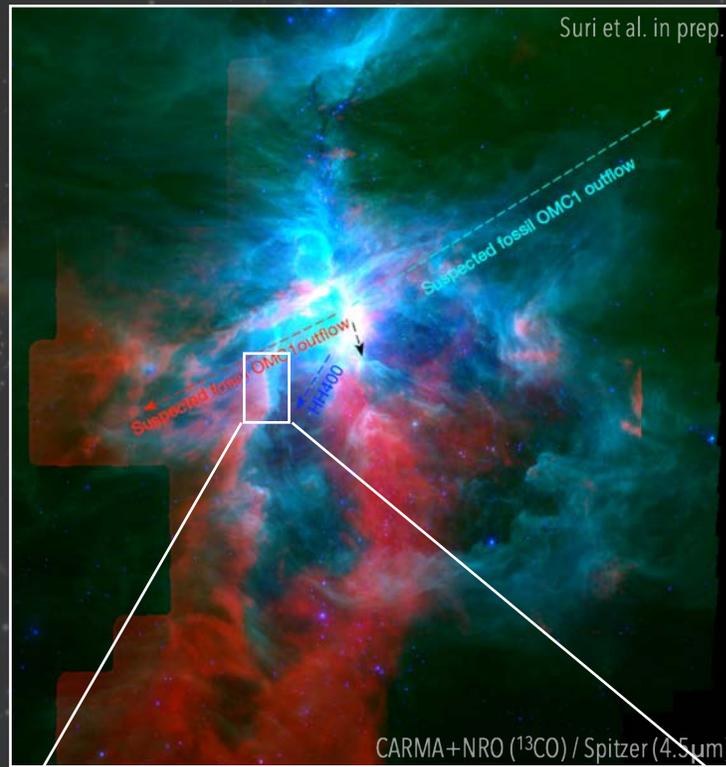


See analytic PDR models by Tielens 2010, Ch. 12

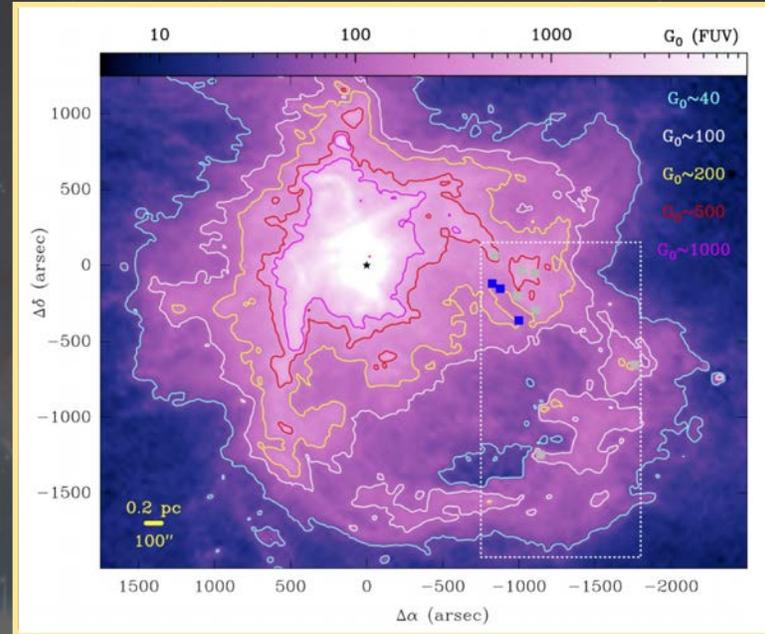
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From Goicoechea et al. 2019:



Low-mass ($< M_J$) molecular globules
 Transient objects formed by instabilities or pre-existing over-dense structures of the molecular cloud



The Puzzle

Is there a way to know whether filaments pre-existed the feedback bubbles?
Can there be enough mass in swept up shells to form stars?