CII in IRDC18223

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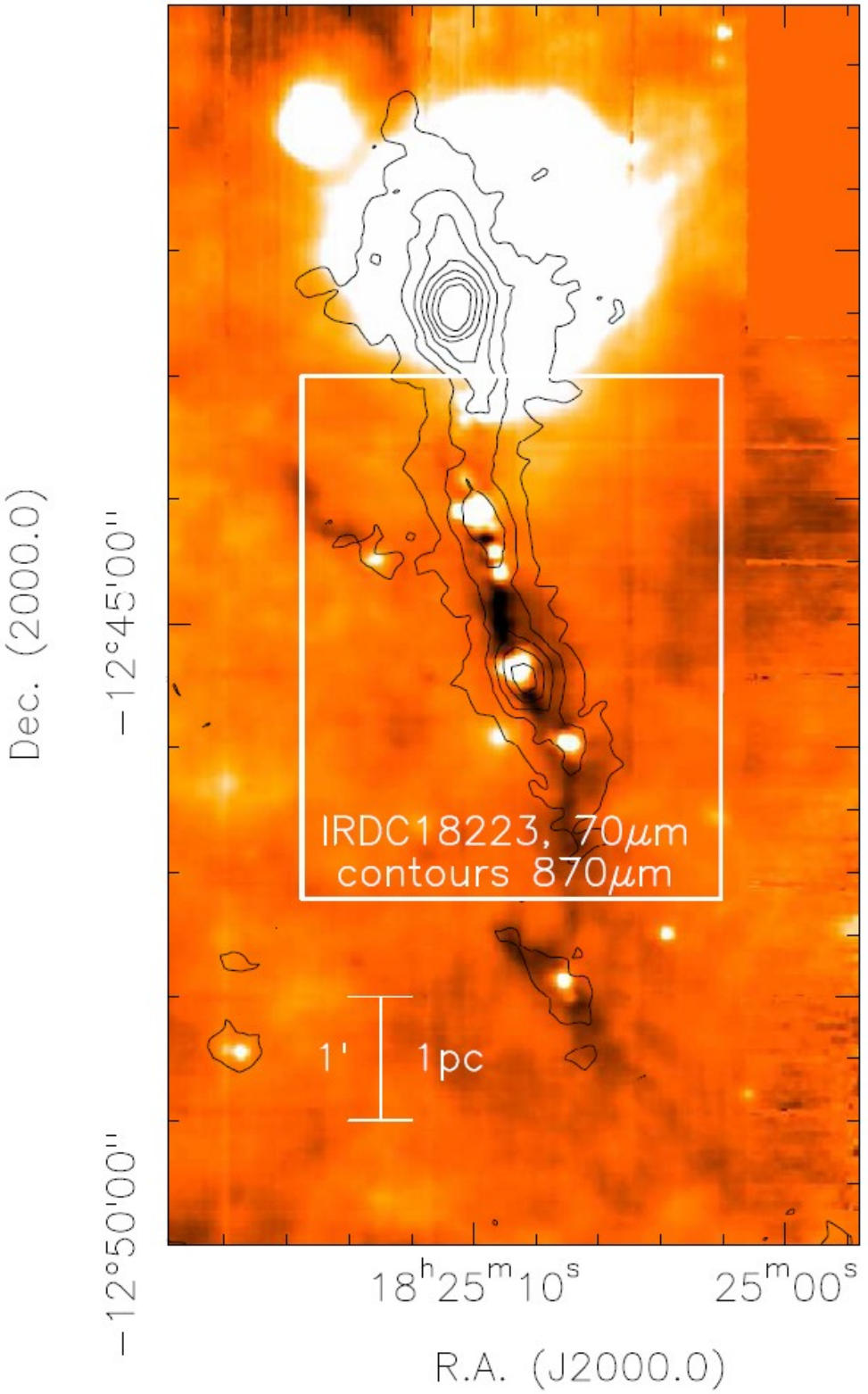
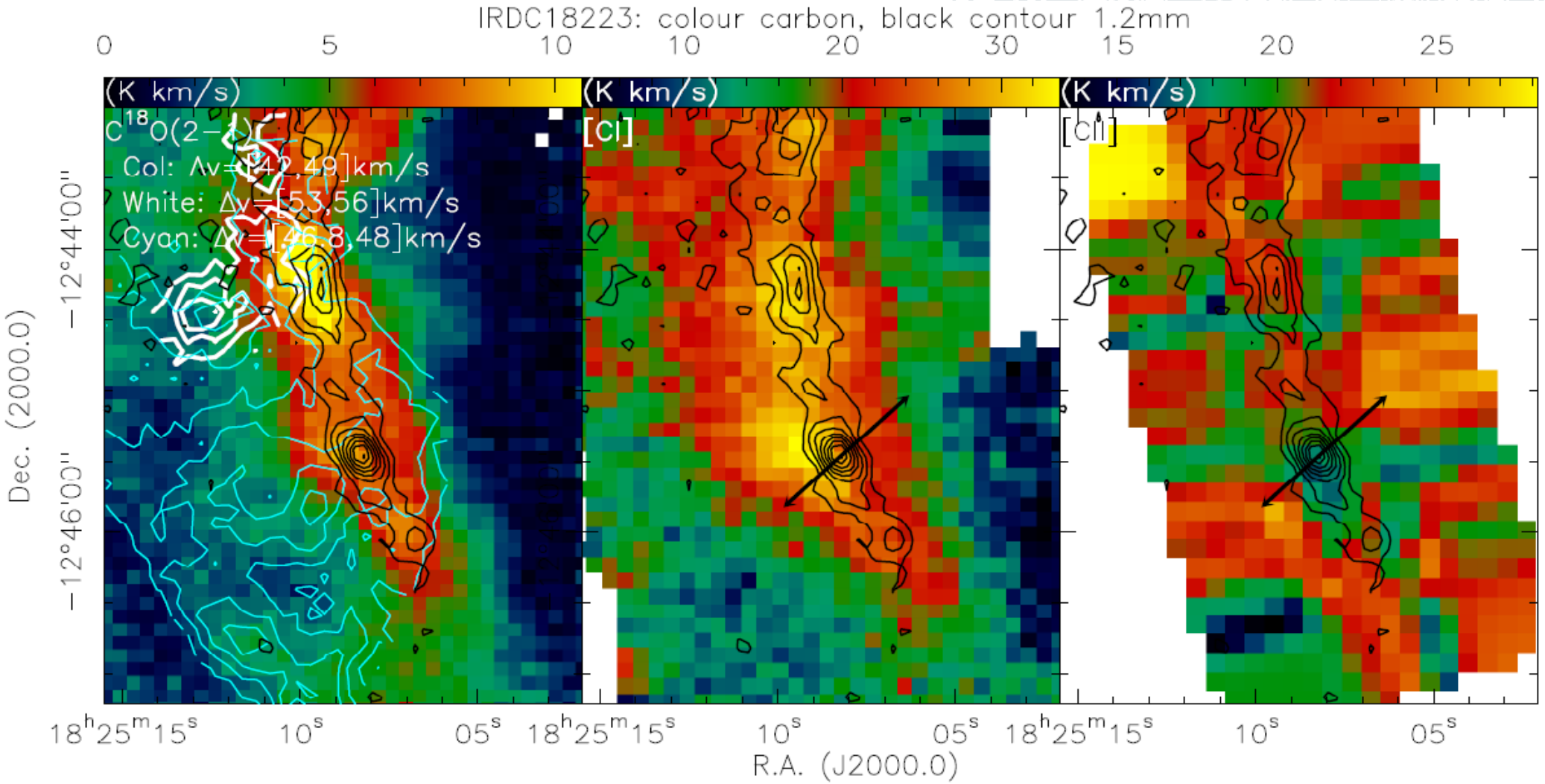
Observations

- GREAT@SOFIA [CII] mapping of IRDC18223
- Combined with APEX observations of $C^{18}O$ 2-1, ^{13}CO 2-1, and [CI] 492GHz
- 4 IRDCs in total, [CII] for 3 of them from HIFI@Herschel



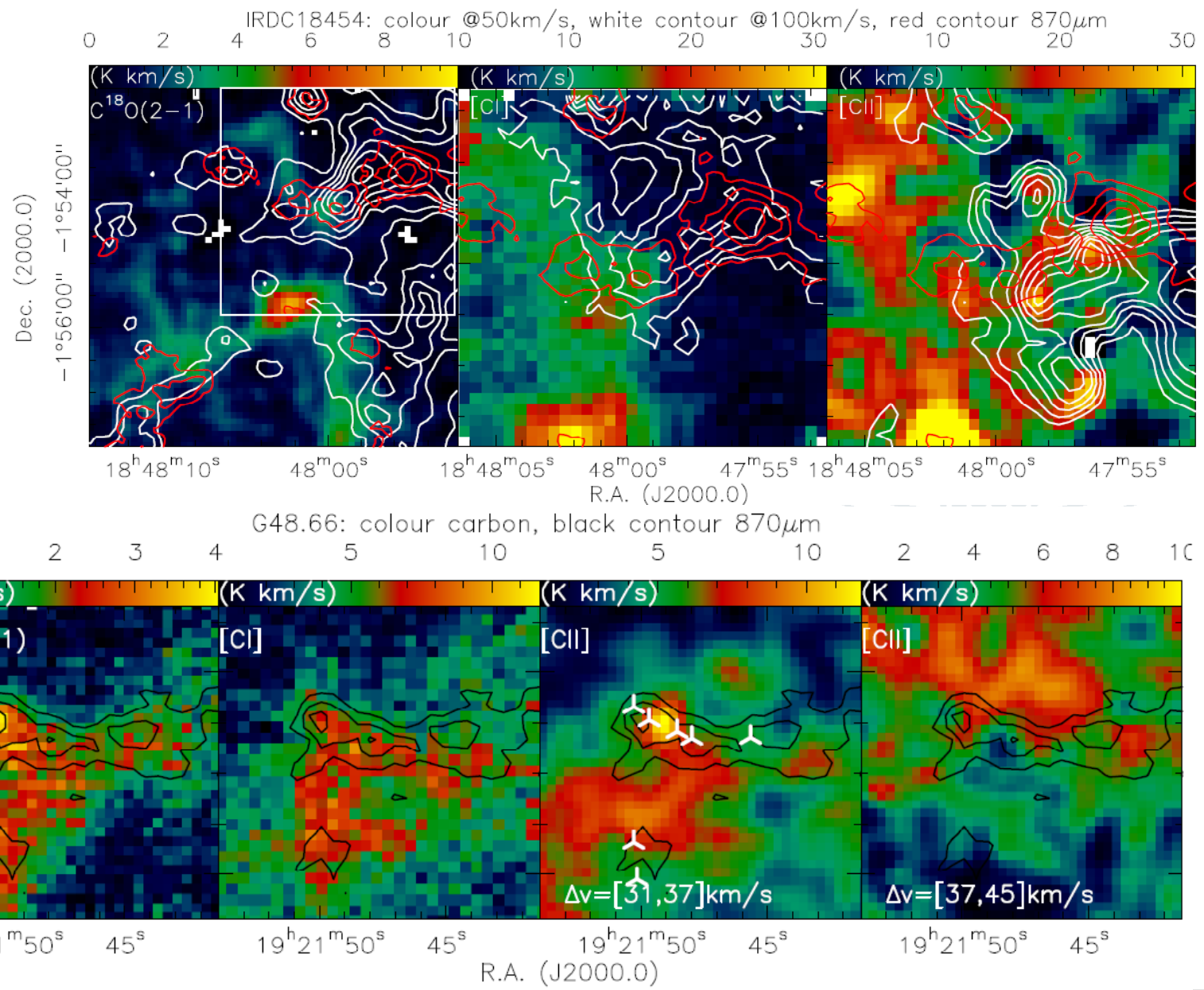
Comparison of spatial distribution



- CII “sticking” out of the IRDC

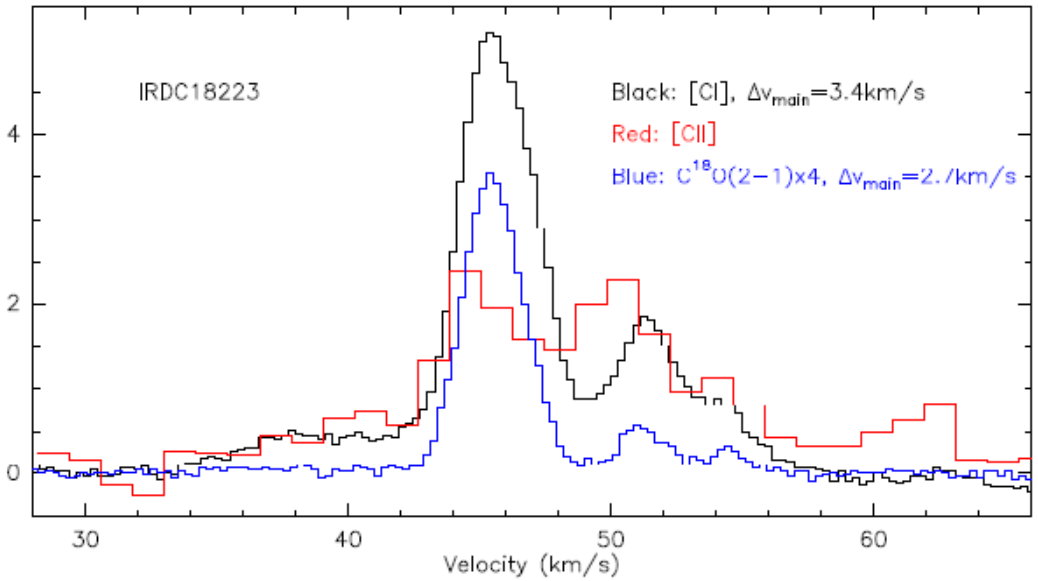
Comparison with other IRDCs

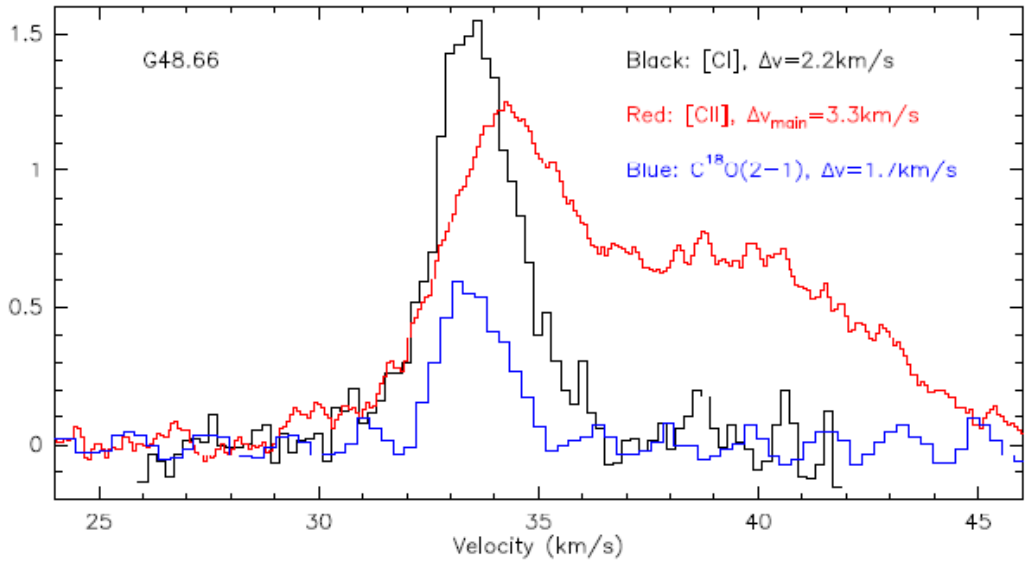
- Qualitatively similar

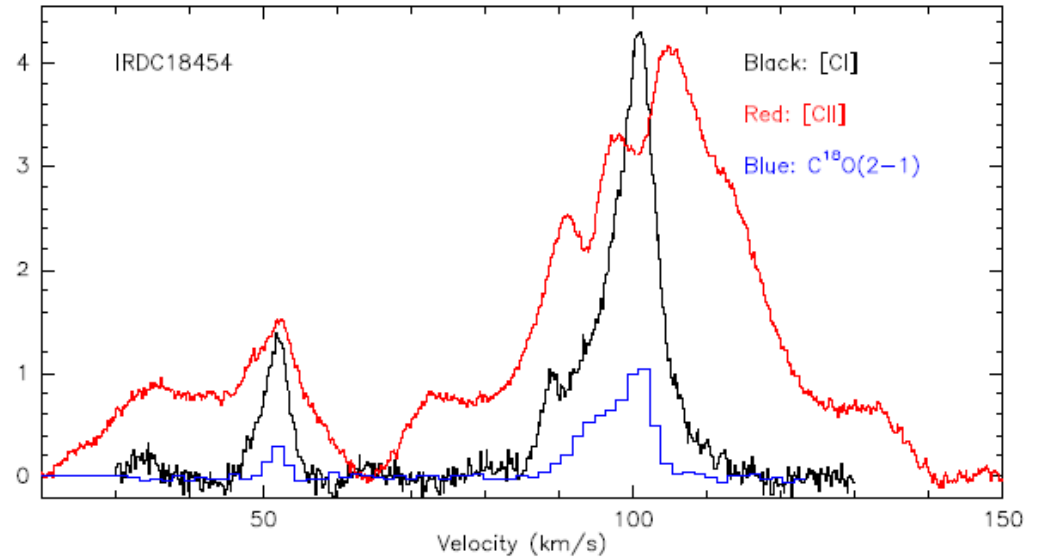


Comparison with other lines and IRDCs

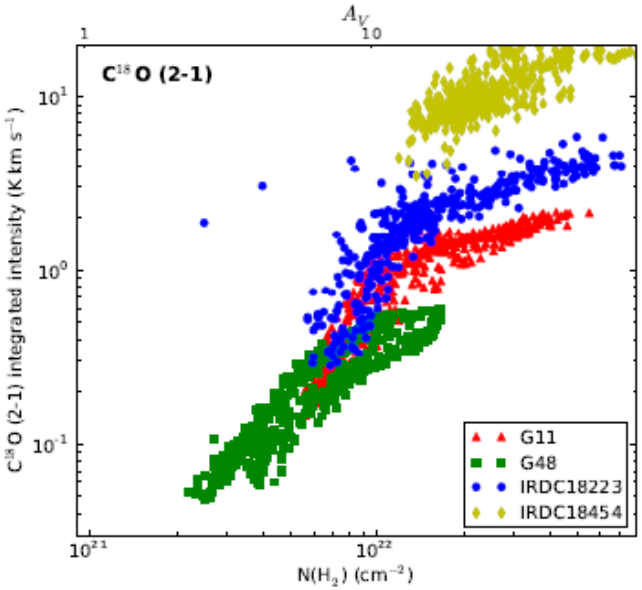
- GREAT [CII] profile is offsets from the other lines
- Unique among IRDCs
- Possible outflow origin

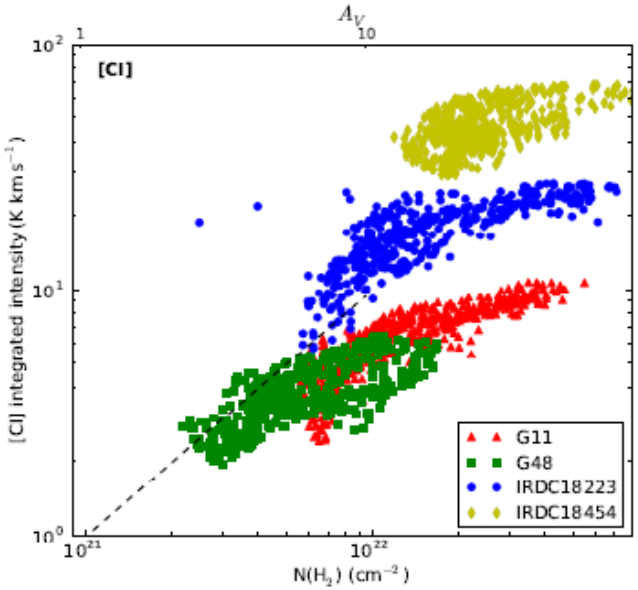


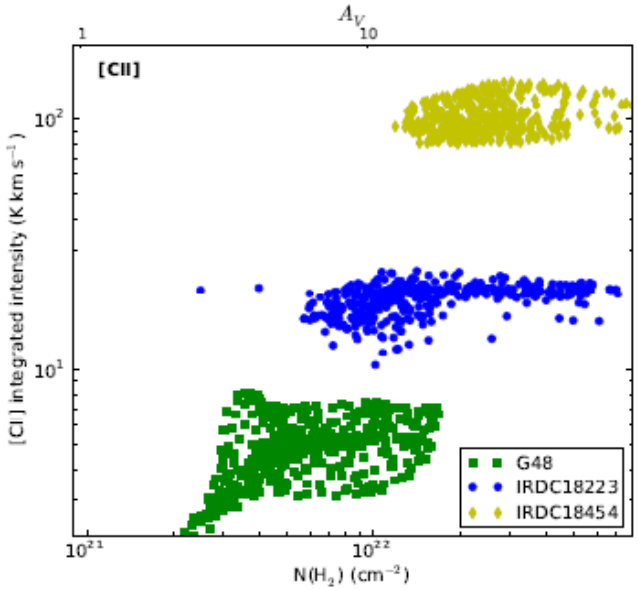




[CII] = tracer of surface and diffuse material, not IRDC







- [CI] is volume tracer
  - correlates very well with ^{13}CO

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Masses of carbon phases

phase	G11.11 ($M_\odot$)	G48.66 ($M_\odot$)	IRDC18223 ($M_\odot$)	IRDC18454[3] ($M_\odot$)
CO	0.81	0.30	1.84	13.4
[CI]	0.056	0.025	0.21	1.6
[CII]@50K	< 0.012	0.12[1]	0.54	14.8
[CII]@100K	< 0.005	0.05[1]	0.21	5.7
CO/[CI]/[CII]@50*K*	14.5/1/>0.2	12/1/4.8	8.8/1/2.6	8.4/1/3.6[2]
Approx. area of emission (pc^2)[4]	5.2	3.7	6.5	31.4

[1] The main component between 31 and 37 km s^{-1}.
[2] [CII] calculated at 100 K because of the energy input from the neighboring W43 region.
[3] Only the 100 km s^{-1} component is evaluated.

- [CII] in IRDC18223 probably due to outflows from protostars in the IRDC
  - Shape partially resembles outflow lobes
- Significant mass fraction in [CII]