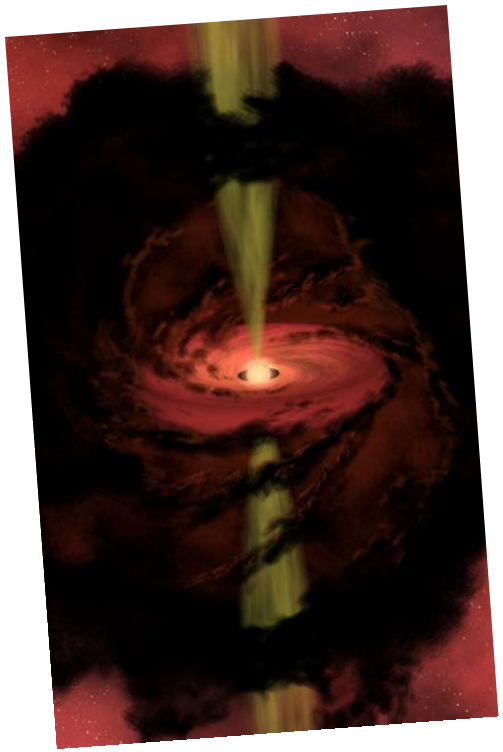
Poster Blitz #3

1 Schmalzl, Markus
2 Spezzi, Loredana
3 Taquet, Vianney
4 Tobin, John
5 Vasta, Magda (2 posters)
6 Yildiz, Umut

Direct Probe of the Water Gas-Ice Chemistry in Embedded Protostars

M. Schmalzl[1], L.E. Kristensen[1], E.F. van Dishoeck[1], R. Visser[2]

[1]Leiden Observatory, Leiden University,
P.O. Box 9513, 2300 RA Leiden, the Netherlands
[2]Department of Astronomy, University of Michigan,
931 Dennison Building, 500 Church Street, Ann Arbor, Michigan 48109-1042, USA



Herschel's view of Chamaeleon II

Detection and disk characterization of Class I to III Young Stellar Objects

L. Spezzi (ESO), T. Prusti, B. Merin, C. Alves de Oliveira, A. Ribas & E. Winston (ESA), N. Cox (KU-Leuven), P. Andre' (CEA-Saclay) & and the HGB Team

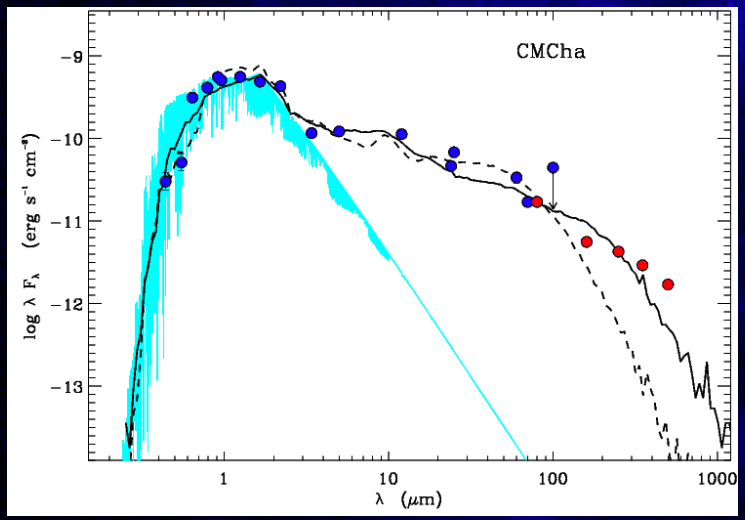
The Herschel dataset in ChaII:

Covered area: 2.7×3.3 deg^2

Instrument	Pass-band	Pixel-size
PACS	70μm	1.40″
PACS	160μm	2.85″
SPIRE	250μm	4.50″
SPIRE	350μm	6.26″
SPIRE	500μm	9.00″

Peliminary statistics of Class I to III YSOs detected by the HGB survey:

	PACS-70μm	PACS-160μm	SPIRE-250μm	SPIRE-350μm	SPIRE-500μm
Class I	3 (75%)	1 (25%)	0	0	0
Flat	1 (50%)	0	0	0	0
Class II	18 (47%)	5 (13%)	4 (10%)	3 (8%)	3 (8%)
Class III	4 (21%)	0	0	0	0



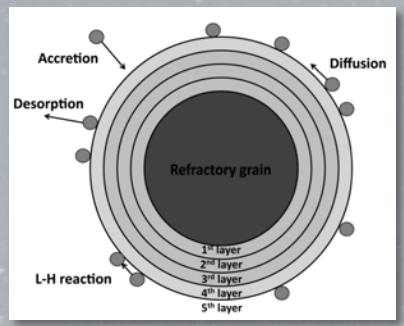
SED fitting: better constrain on disk mass and outer radius !

Source: CMCha	SED fitting with HGB data	SED fitting without HGB data
Disk inner radius (AU)	0.86	0.77
Disk outer radius (AU)	400	348
Disk mass ($M_\odot$)	0.025	0.01

Herschel CHESS observations of ozone and deuterated water: the GRAINOBLE model interpretation

Vianney Taquet[1], C. Ceccarelli[1], E. Caux[2], S. Bottinelli[2], A. Coutens[2], C. Kahane[1], A. Lopez-Sepulcre[1], P. Peters[1,3], C. Vastel[2]

1: IPAG, Grenoble 2: IRAP, Toulouse 3: PhLAM, Lille



Taquet et al. (2012, A&A)

The GRAINOBLE model

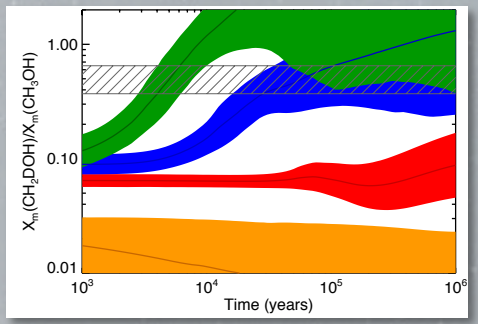
- multilayer formation of ices

➔ chemical differentiation within grain mantles

- multiparameter approach

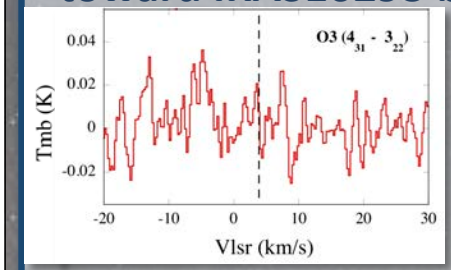
➔ grid of runs and distributions of abundances

- new treatment of deuteration on grains



Taquet et al. (2012, ApJL)

HIFI observations of ozone toward IRAS16293 by CHESS



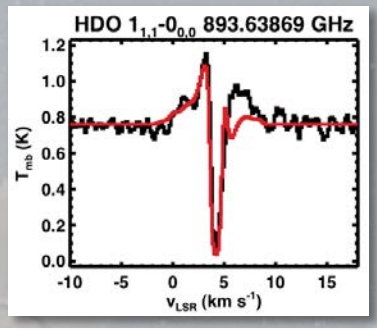
$X(O_3) < 5\ 10^{-8}$ in the hot corino

Comparisons with GRAINOBLE + gas phase model predict that ozone formed on grain mantles is burned into O_2 in the gas phase.

Unfortunately, the HIFI-CHESS observations are not sufficient to constrain the O_2 abundance.

HIFI observations of deuterated water toward IRAS16293

Coutens et al. (2012, A&A)



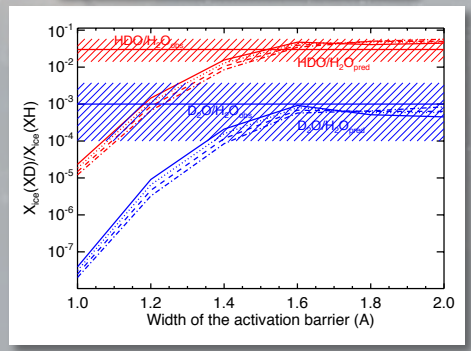
$HDO/H_2O \approx 3\ \%$

$D_2O/H_2O \approx 0.1\ \%$ in the hot corino

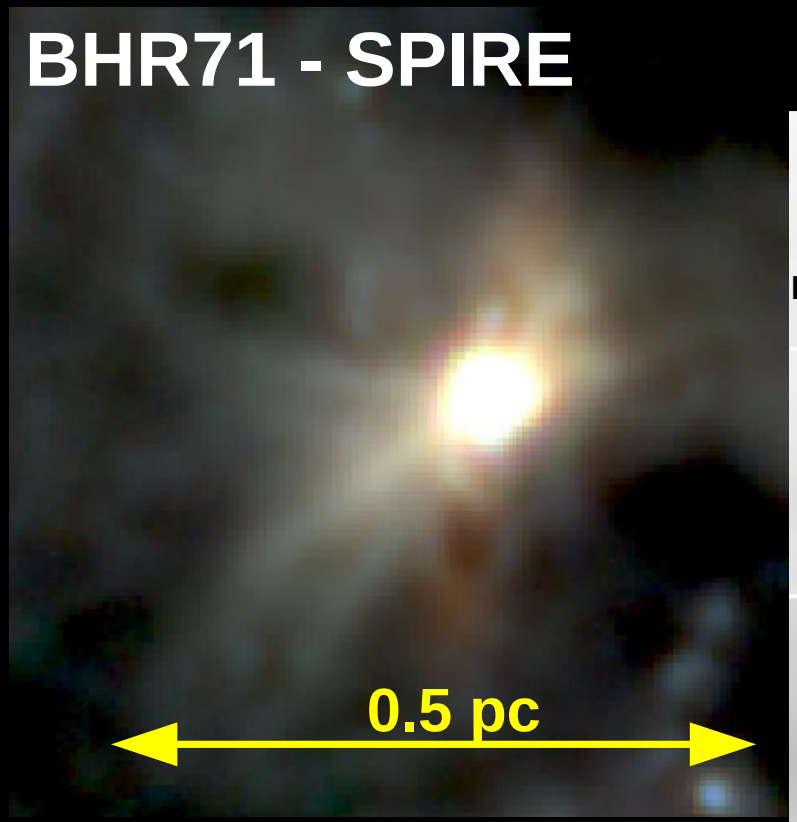
Comparisons with GRAINOBLE

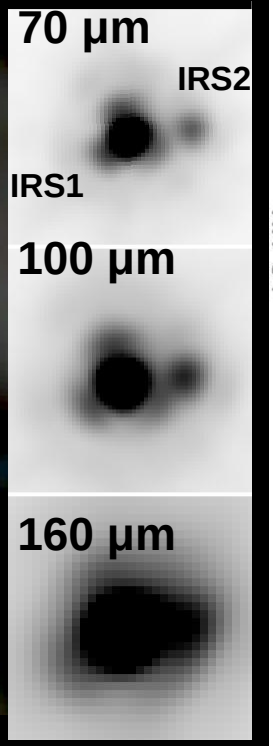
➔ The two deuteration ratios can be well reproduced, providing constraints on the microphysics.

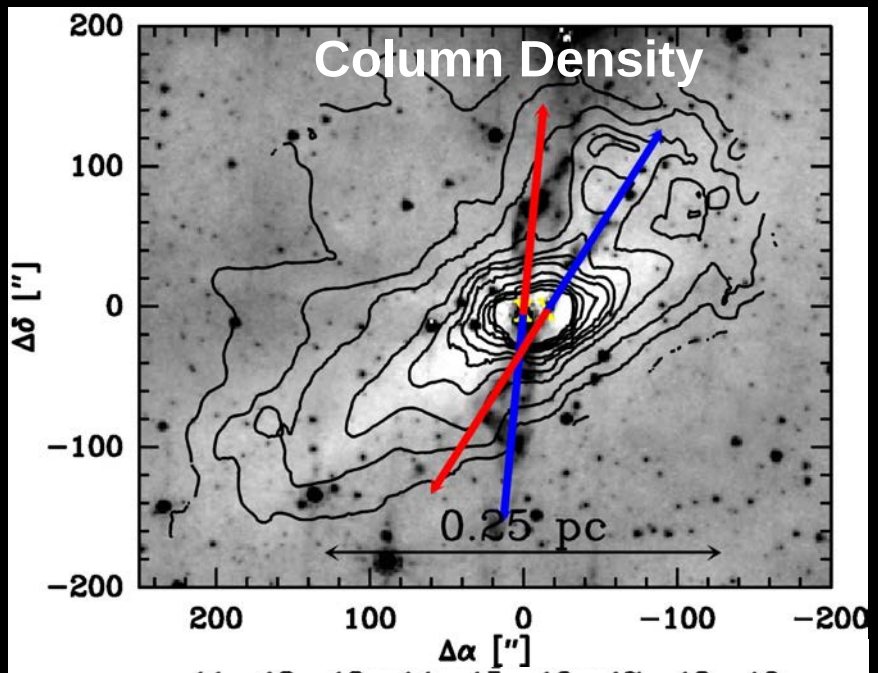
ex: deuteration of water as function of the width of the H_2+OH -> H_2O+H reaction barrier

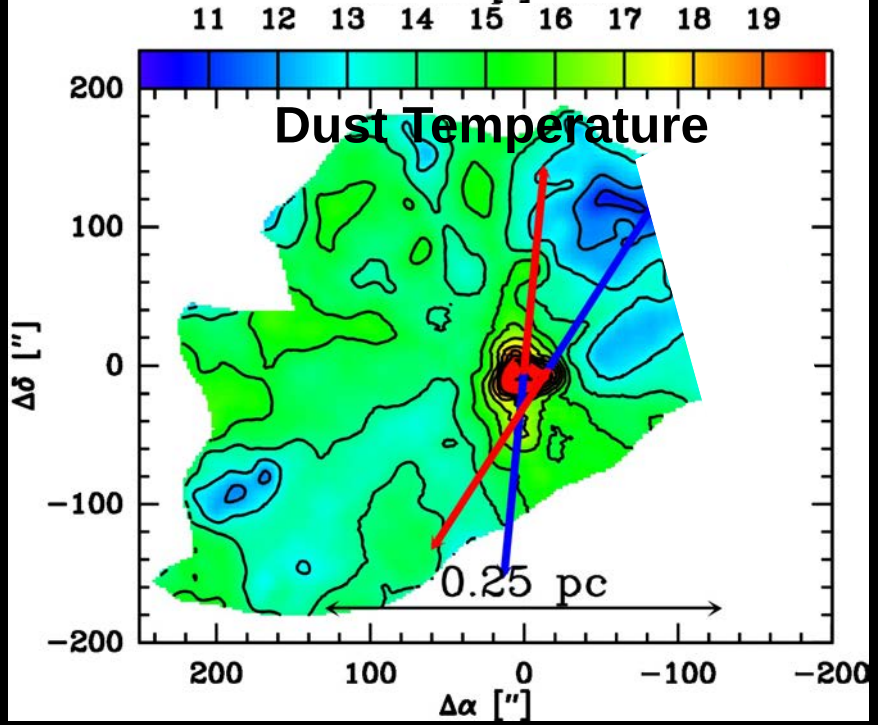


Resolved Protostellar Envelope Structure in the Far-IR/Submm







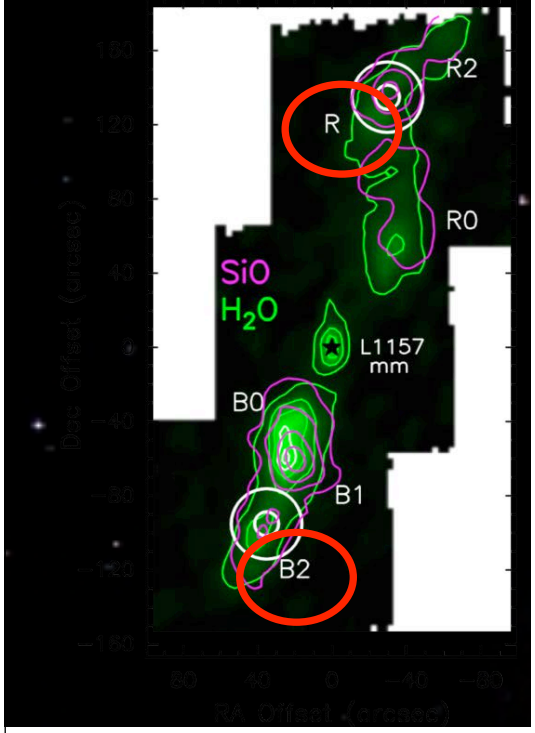


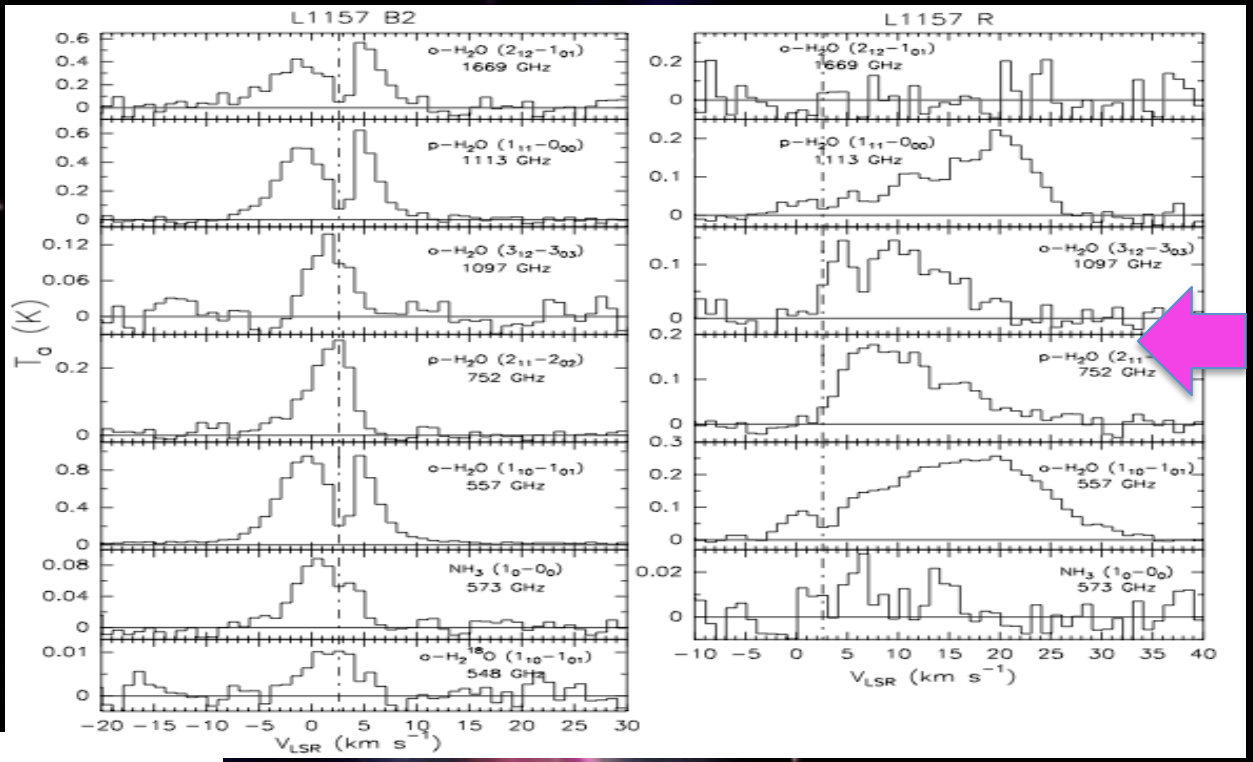
John Tobin, Amy Stutz, Babar Ali, & Lee Hartmann

- IRS1 SED peak 100 μm, IRS2 at 160 μm
  - T_{bol} = 45K (IRS1), 32K (IRS2)
  - Nearly coeval Class 0 protostars
- Envelope emission detected down to A_V~1
  - 4 M_{sun} envelope at R = 0.1 pc
  - Closely follows 8 μm extinction
- Heating along outflow cavity evident
  - T ~ 17K in outflow, T ~13K in envelope

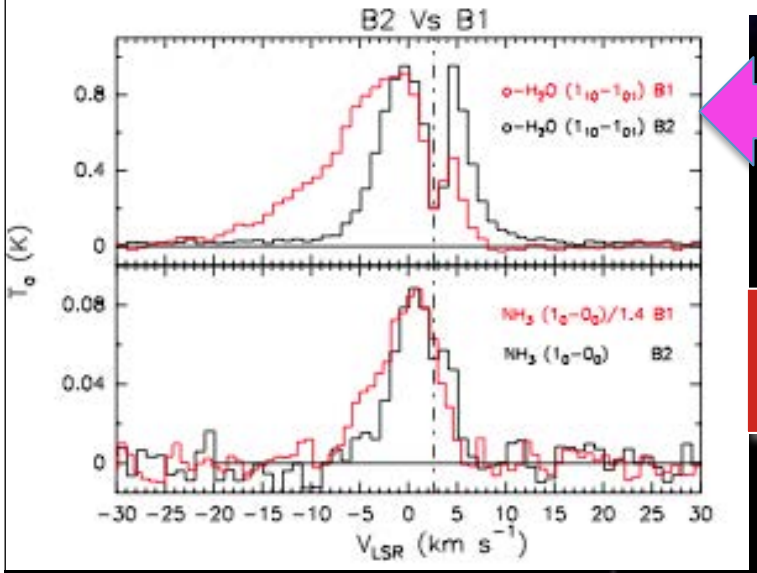
WATER EMISSION FROM THE CHEMICAL RICH OUTFLOW L1157

Vasta M. , Codella C. , Lorenzani A., Santangelo G., Nisini B., Giannini T. , Tafalla M. , Liseau R. , Kristensen L. , Van Dishoeck E.



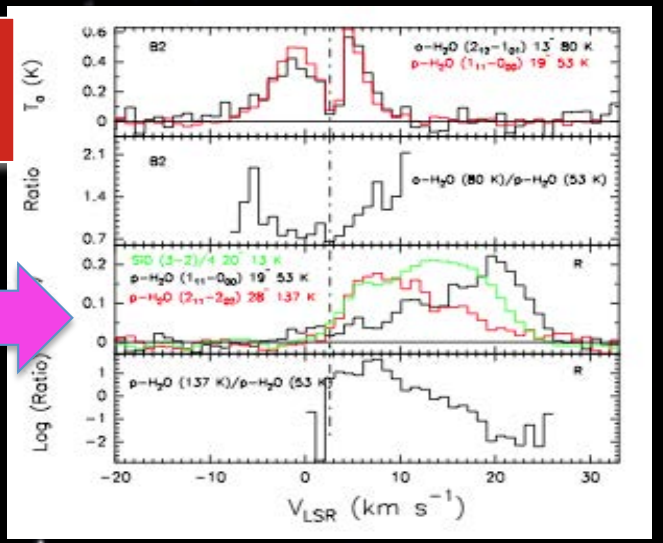


L1157 R: HIGH velocity emission associated to the LOW excitation emission lines.



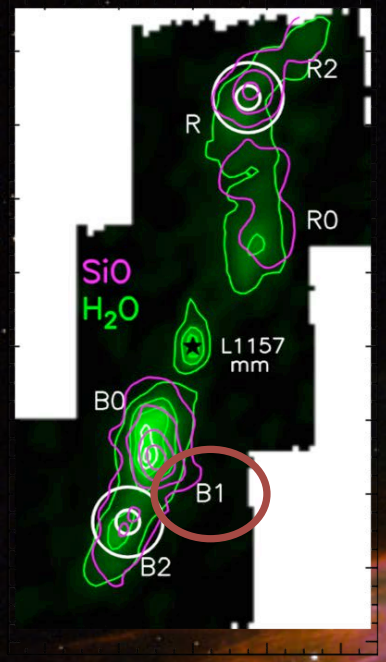
Comparison with H_2O observations of B1.

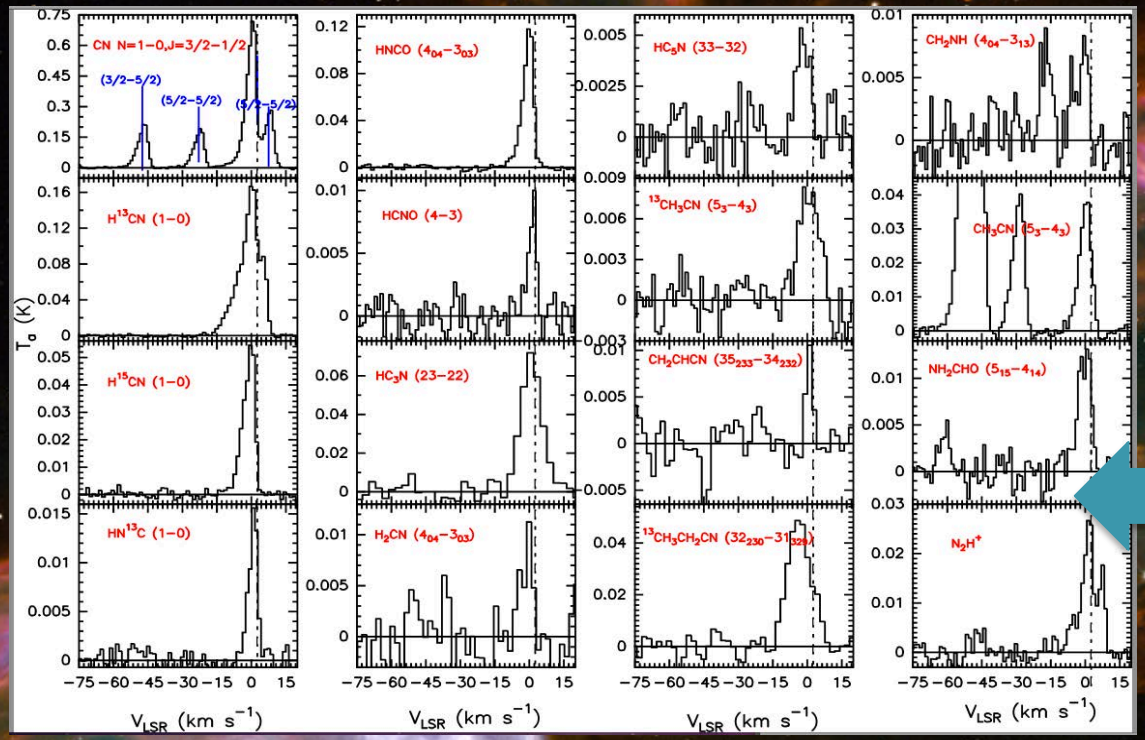
SiO peakes where H_2O Emission is fainter.



The Herschel-CHESS unbiased search for N-bearing species in the chemically rich outflow L1157 B1

Vasta M. , Viti S., Codella C., Lefloch B., Busquet G., Ceccarelli C., Benedettini M., Gusdof A. and the CHESS team.

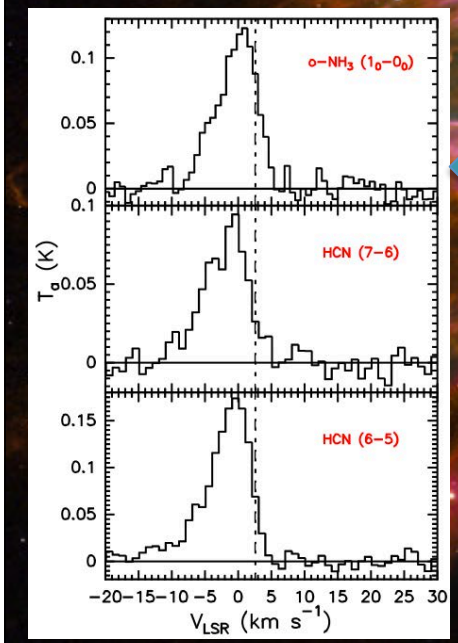




IRAM survey:
- -13 HC_3N transitions
- -11 HC_5N transitions
- -7 HNCO transitions
- -NH,N_2H^+,NH_3
- -CN,HCN, HNC,DCN

More complex molecules :
- -CH_3CN,HCNO, CH_2NH,NH_2CHO etc

Many Isotopologues!!!

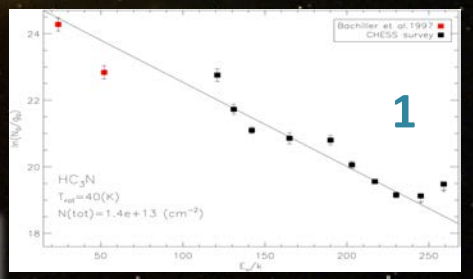


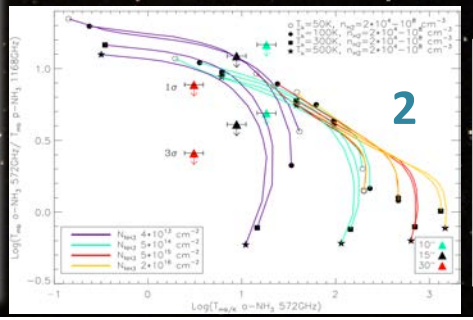
N- bearing species observed with HIFI Herschel.

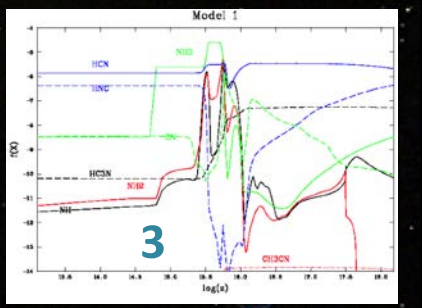
1 HC_3N, HC_5N, HCN, HCNO rotational diagrams.

2 LVG analysis of the NH_3 line emissions in L1157 B1.

3 Nitrogen chemistry models in (low velocity) shocked regions.







See Related Poster
- -Codella C. et al.
- -Lefloch B. et al.
- -Busquet G. et al.

High-J CO survey of low-mass protostars observed with Herschel-HIFI and the LOMASS database

Sterrewacht Leiden

WISH

Molecular Line Database for Low-mass protostars JCMT, APEX, Herschel

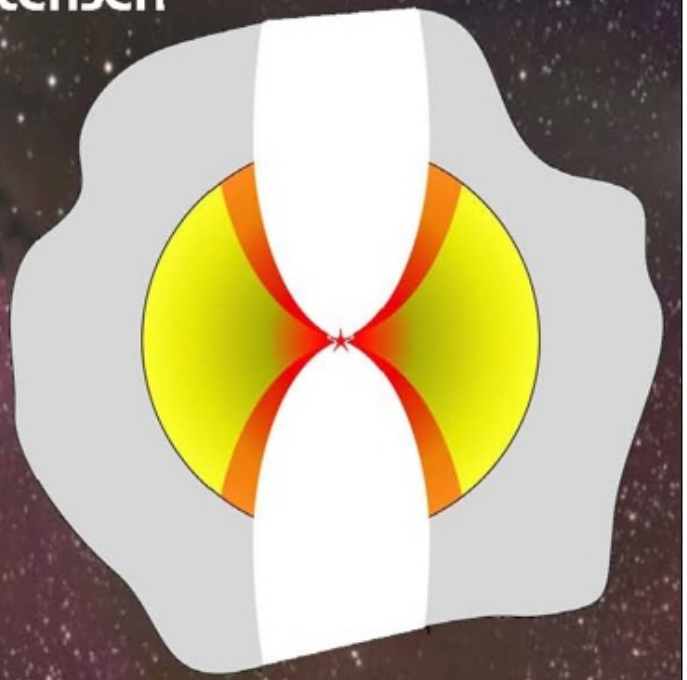
LOMASS

Umut A. Yildiz

Ewine van Dishoeck

Lars E. Kristensen

Which line traces which physical component?



Poster: Tue+Wed, Topic 2

Thank you