

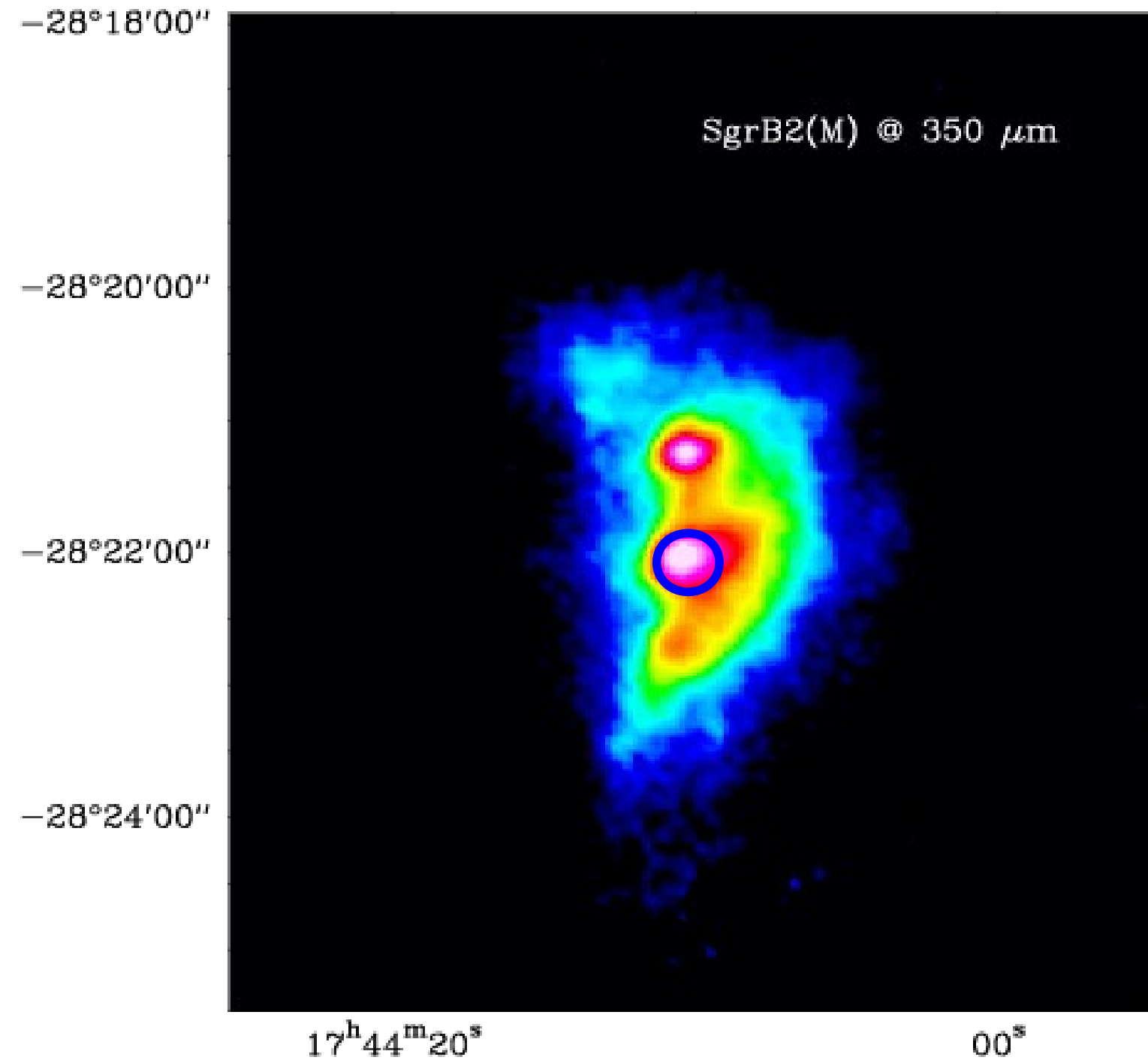


Unbiased HIFI spectral survey of SgrB2(M)

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University of Cologne/MPIfR

HEXOS team





Dowell et al. 1999

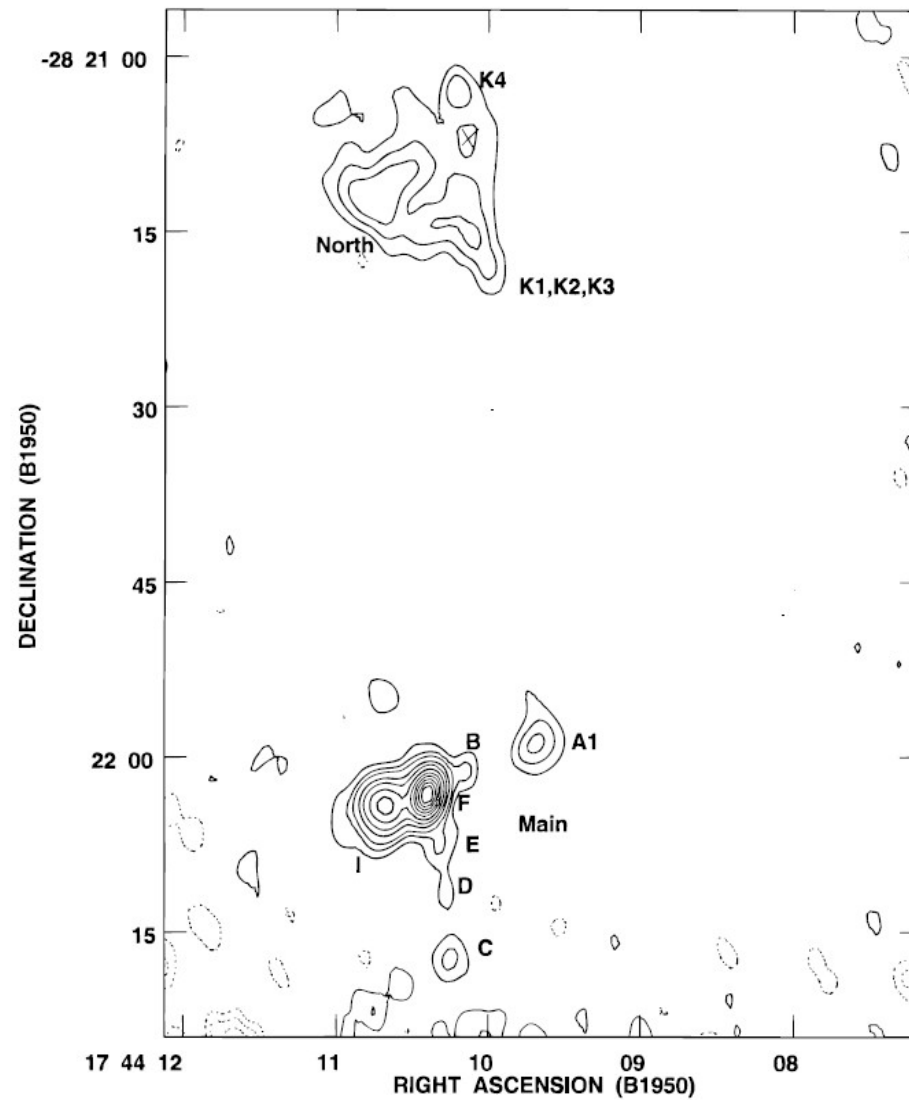
$$L = 5 \times 10^6 L_{\odot}$$

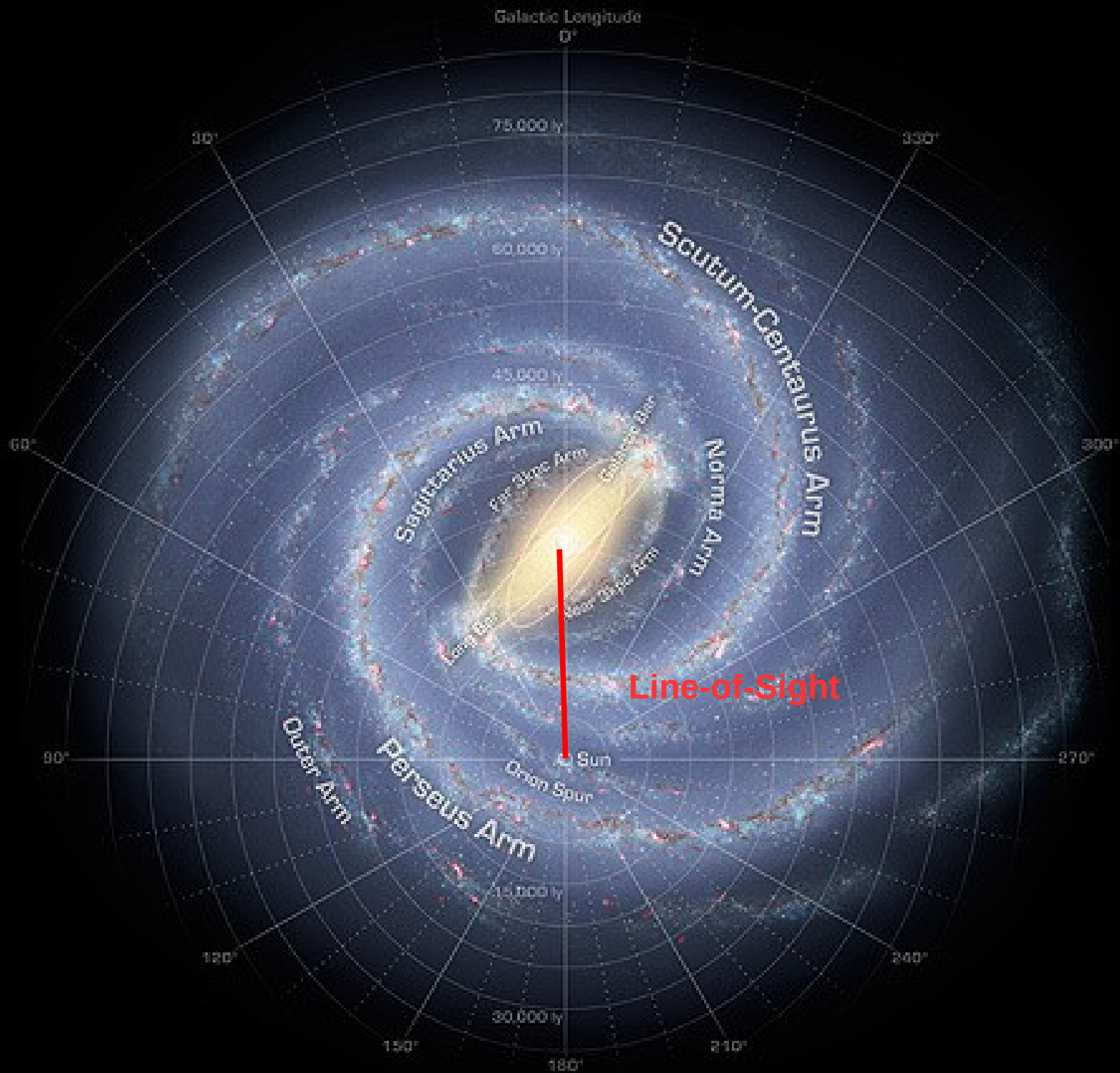
$$M = 5 \times 10^5 M_{\odot}$$

Centimeter continuum

MEHRINGER & MENTEN

Vol. 474

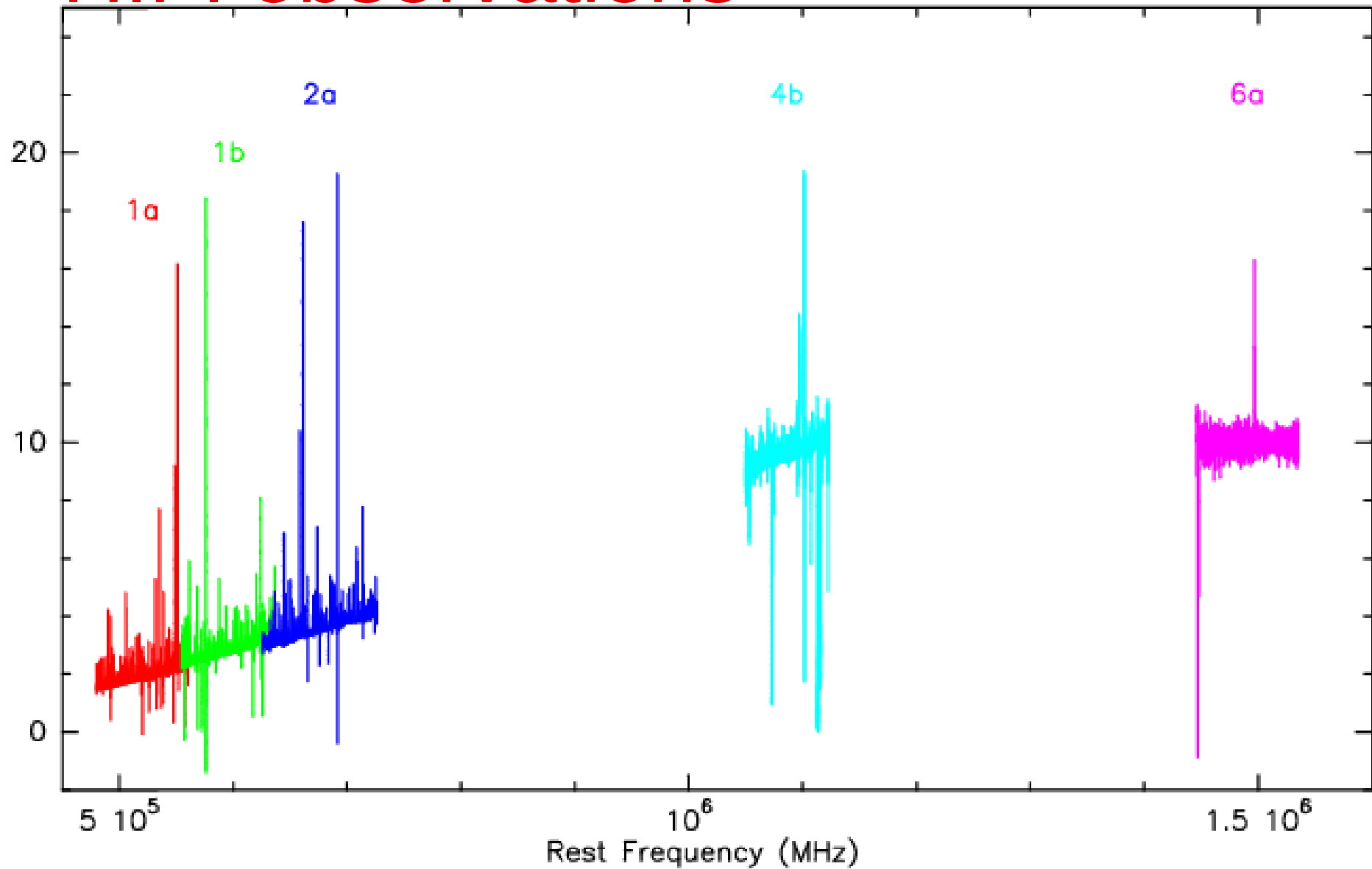




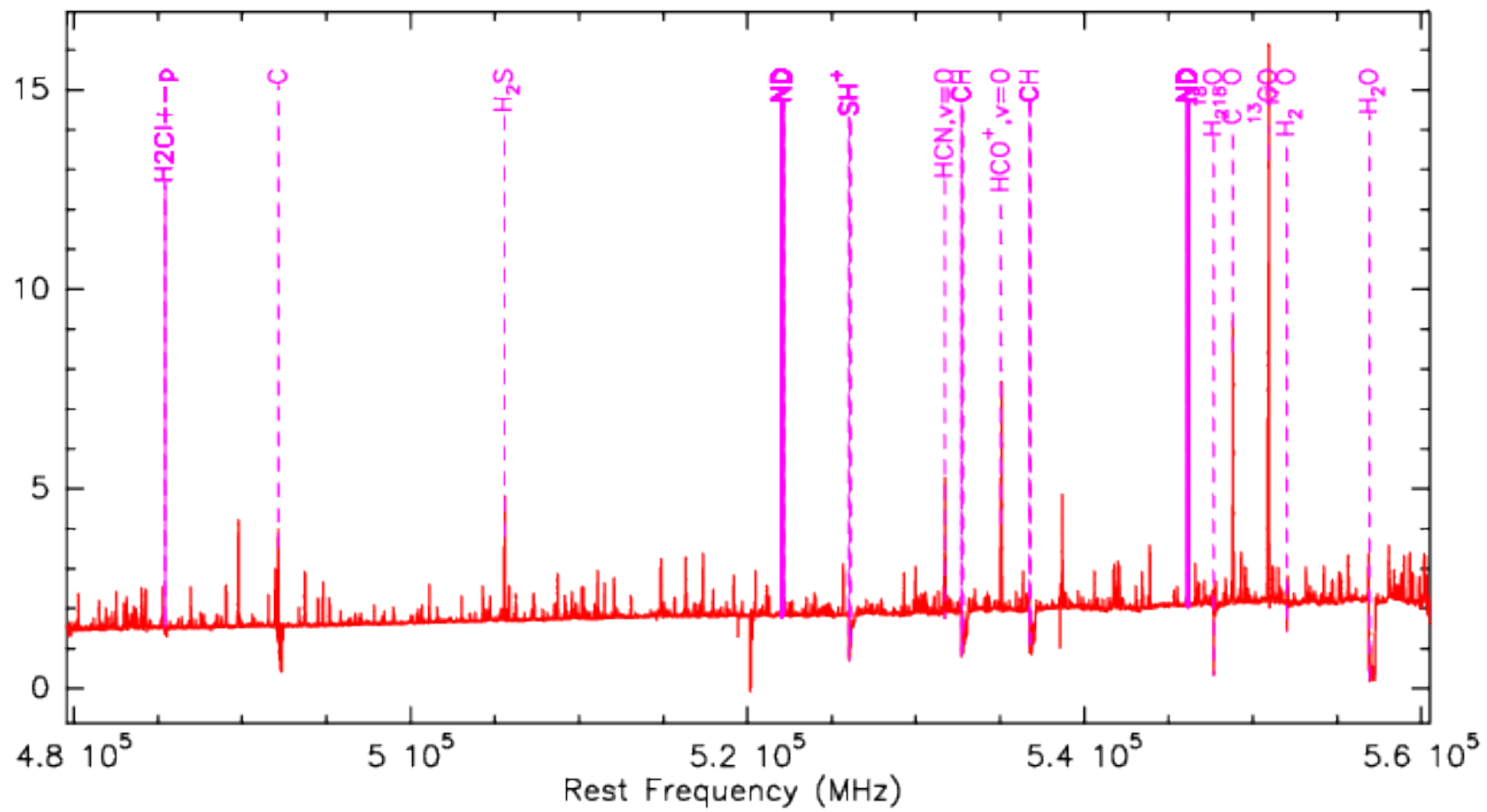
Observing SgrB2(M) allows a simultaneous study of

- a very massive, cluster-forming core
 - Including the velocity field
 - Density and temperature structure
 - Chemical structure
- a large collection of translucent and diffuse clouds across the Galaxy
 - By serving as background illumination

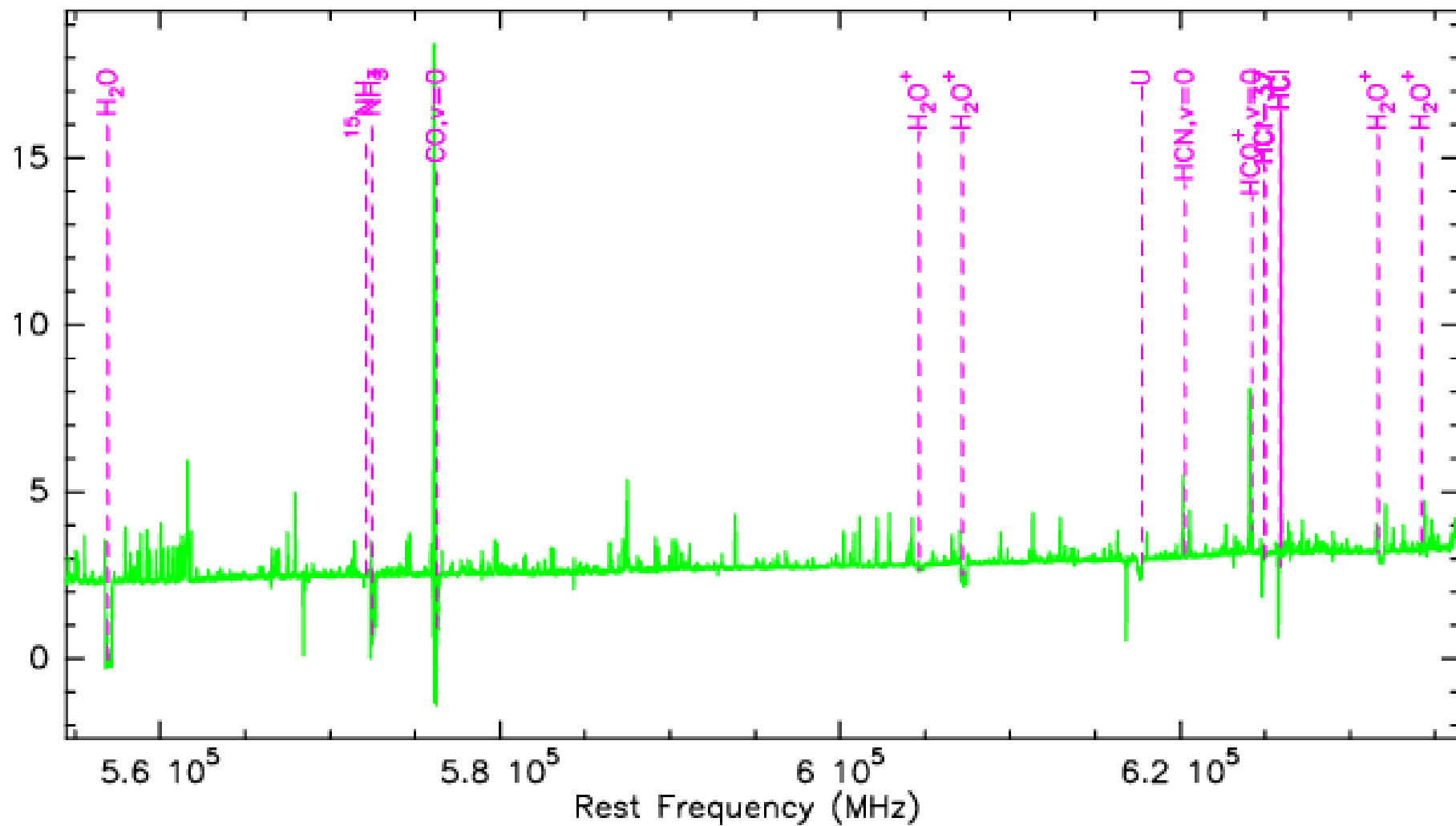
HIFI observations



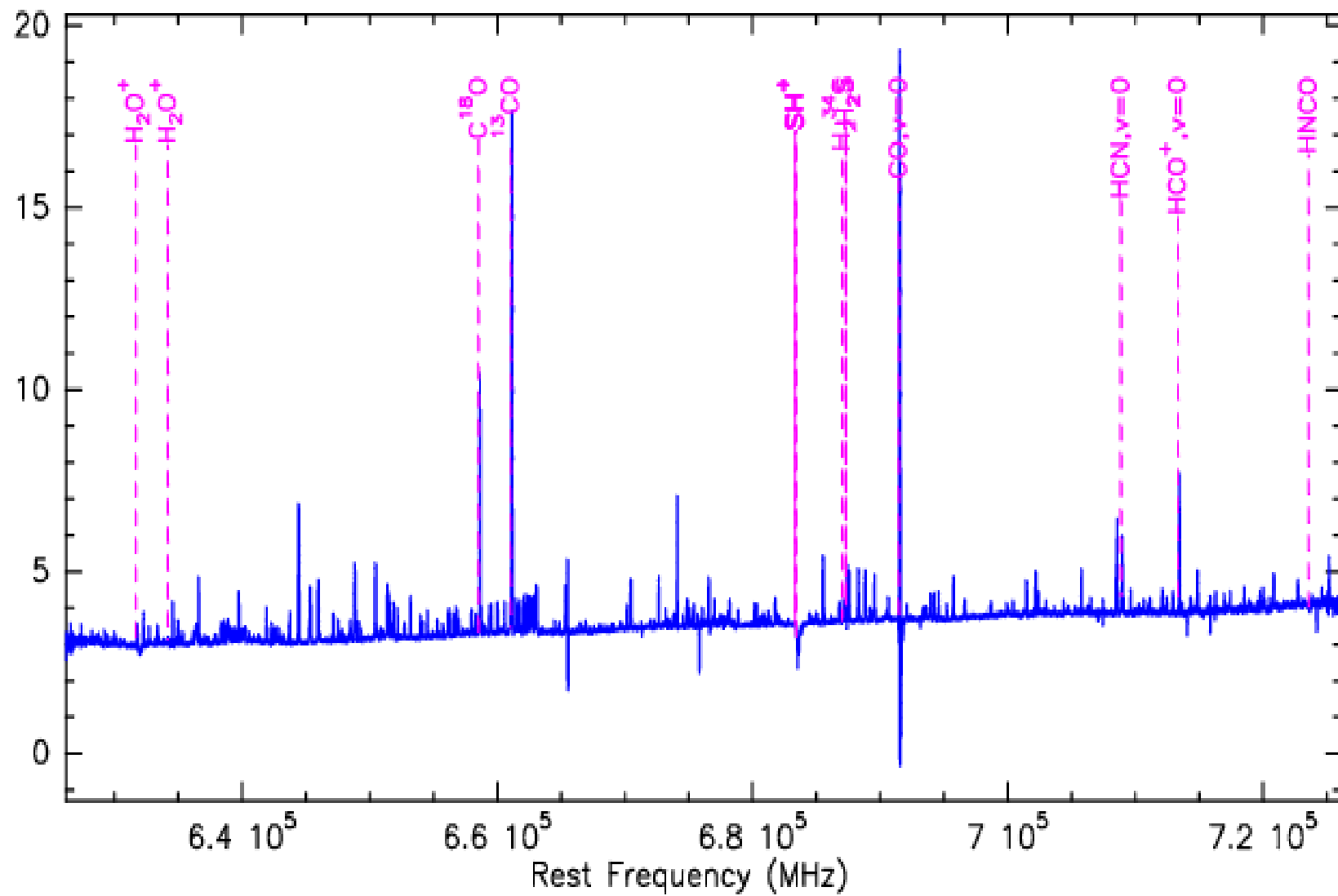
1a



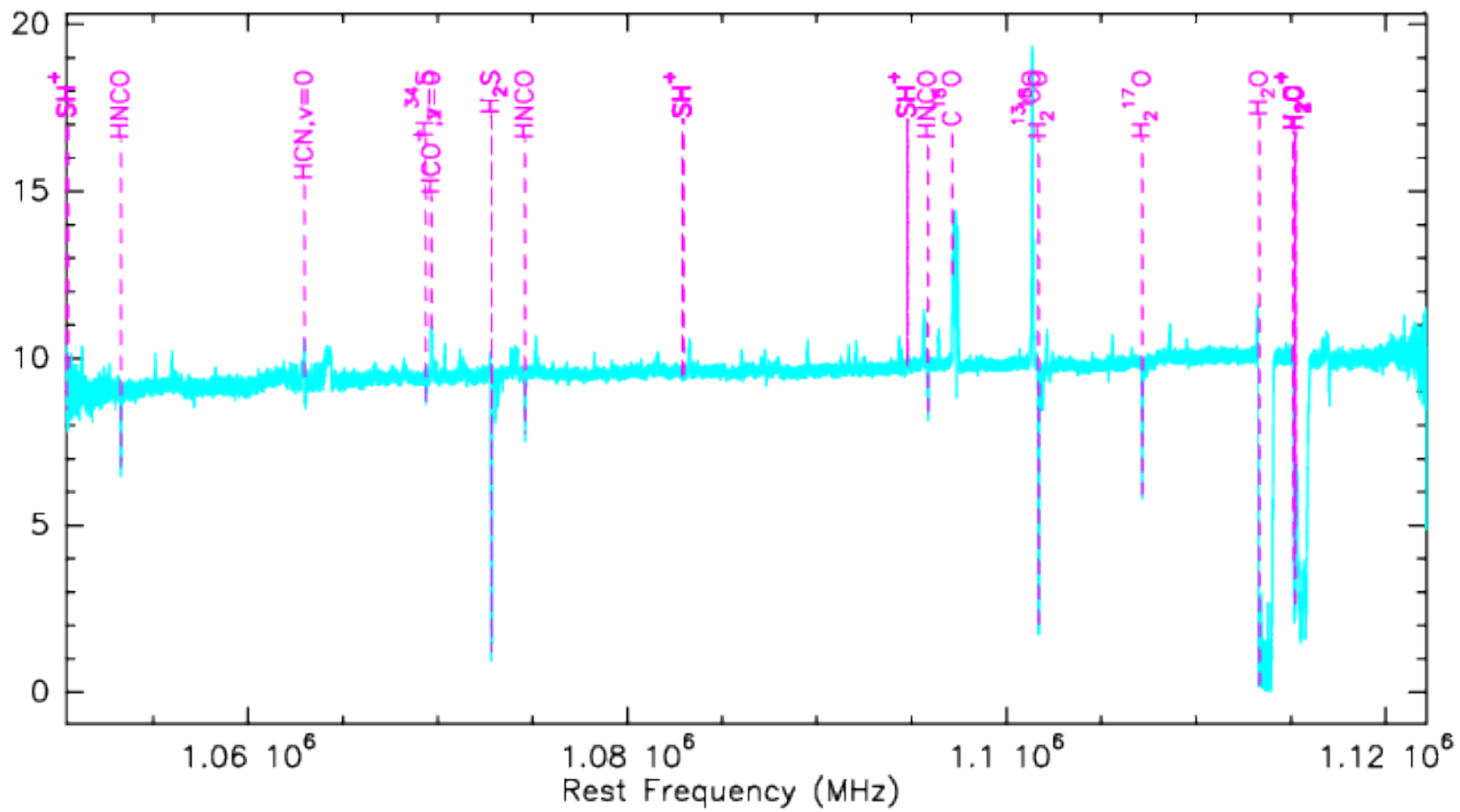
1b



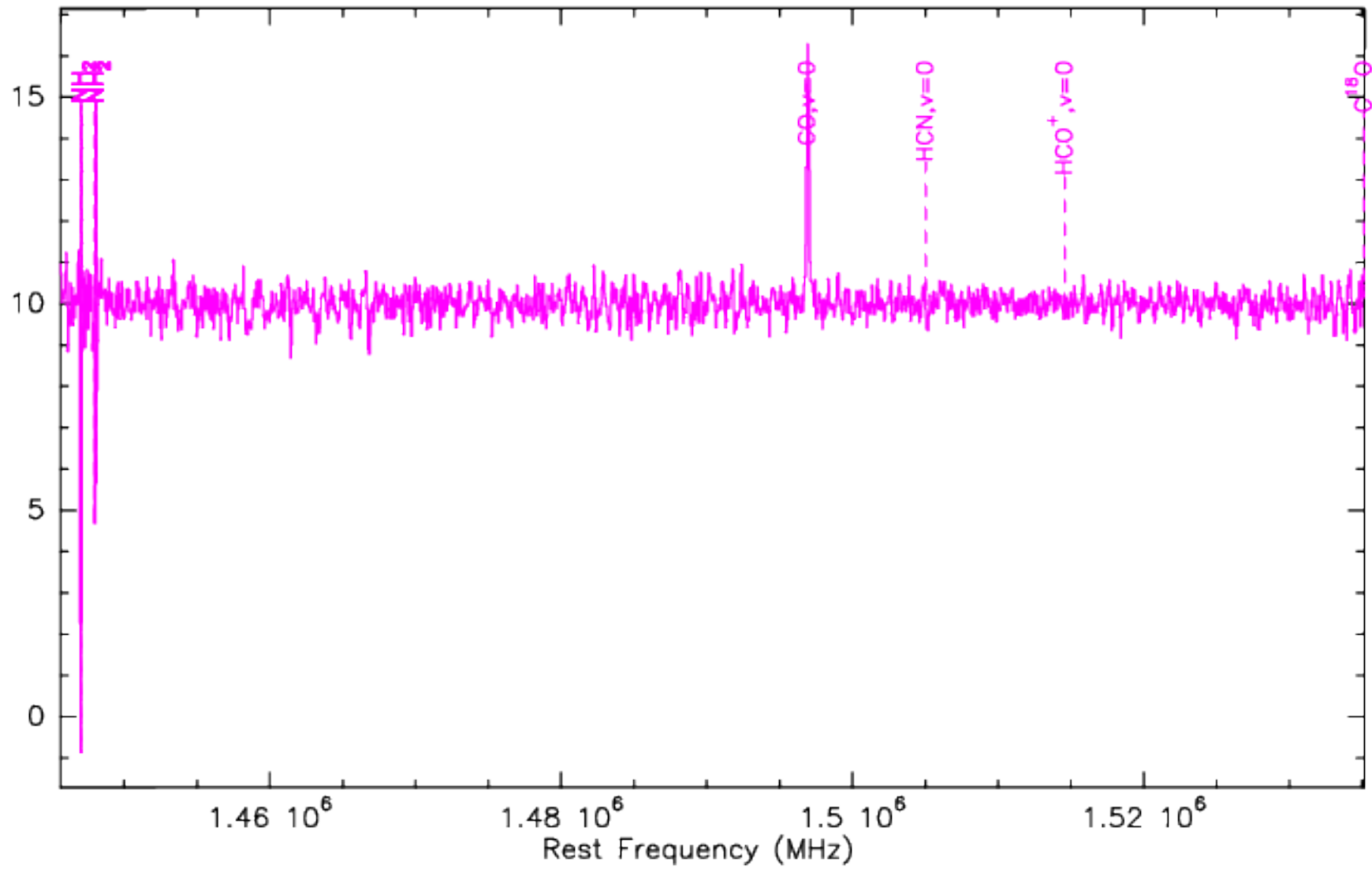
2a



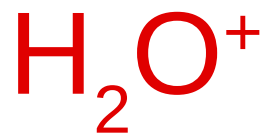
4b



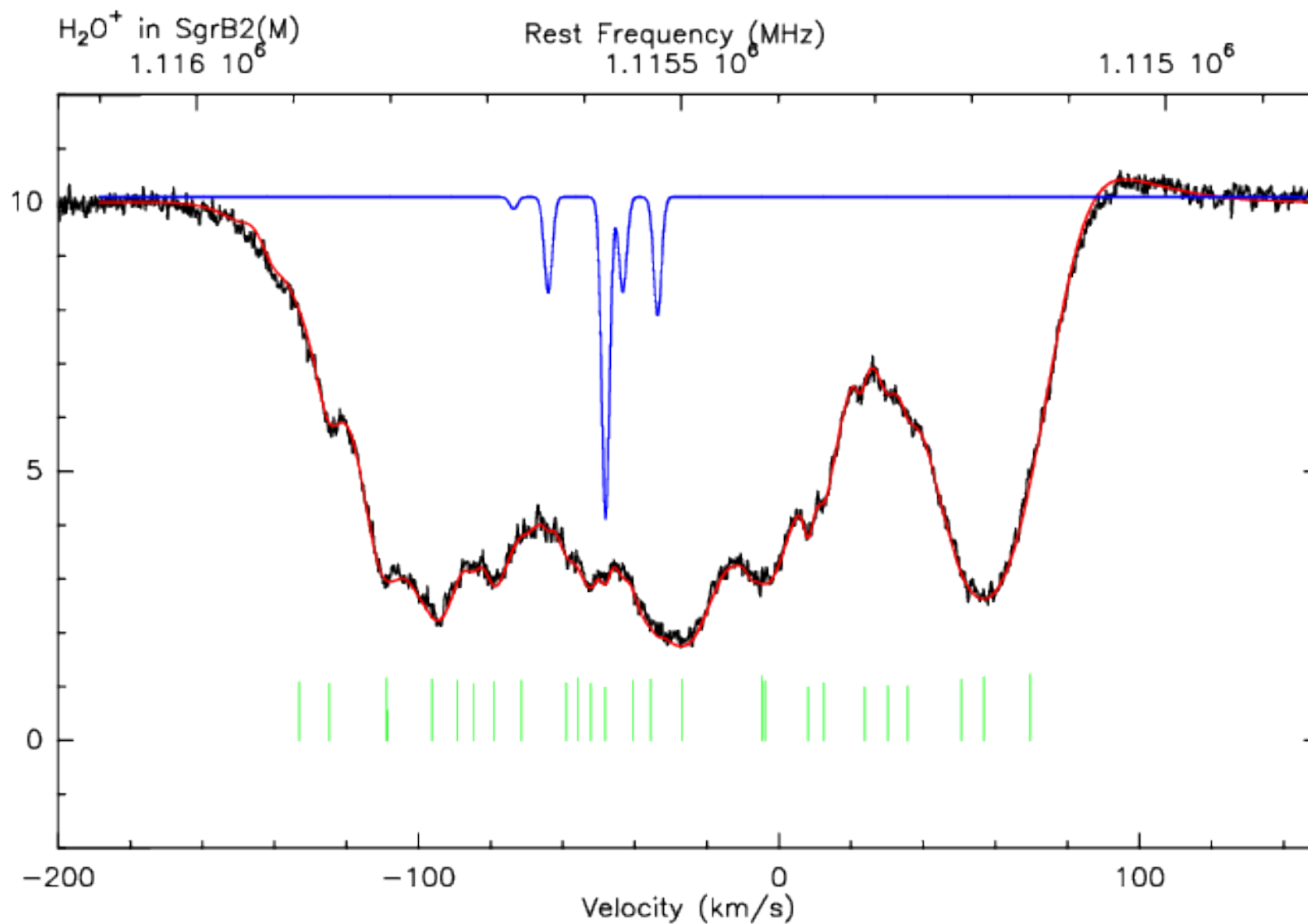
6a



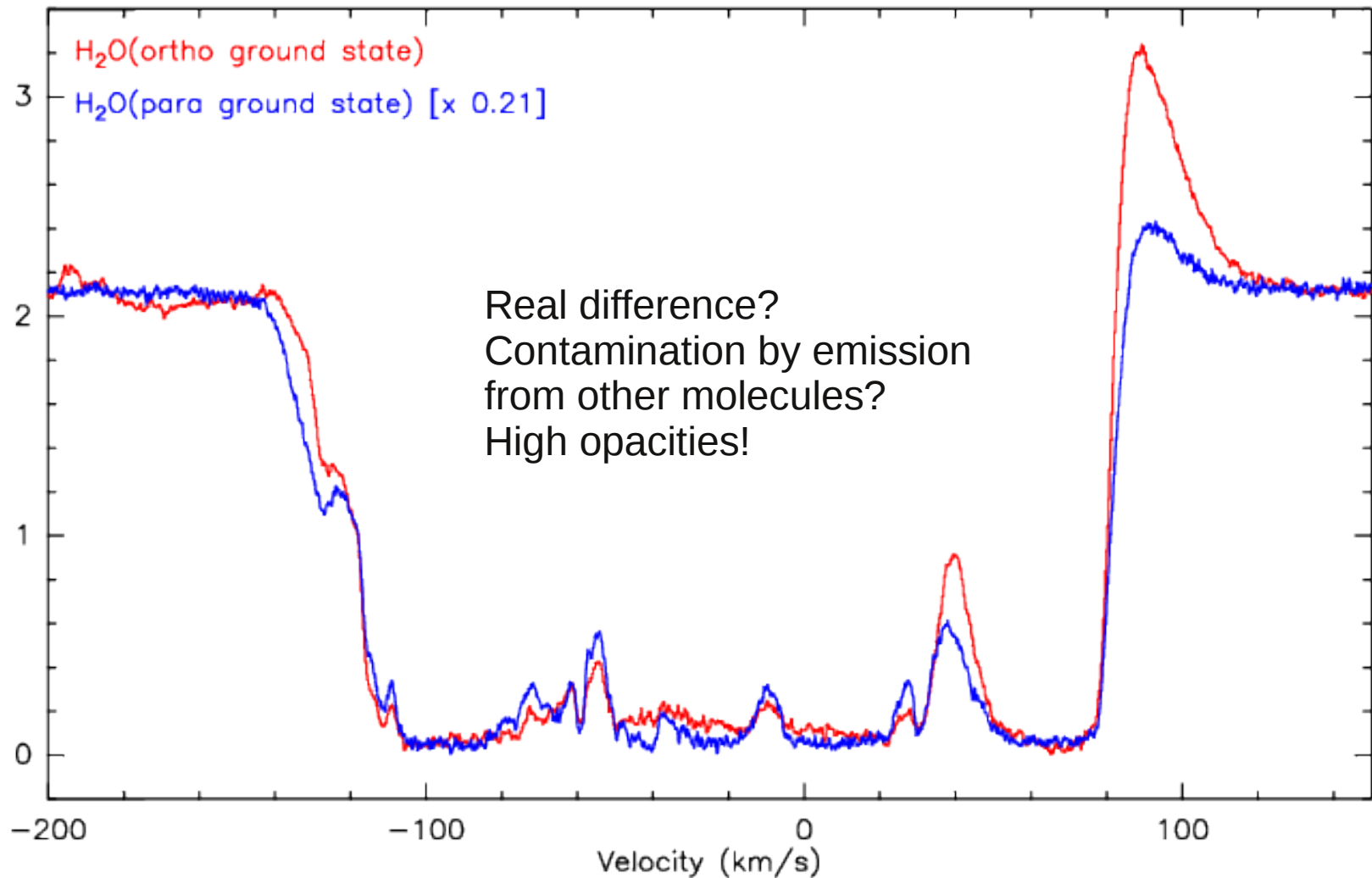
Spiral arm cloud molecules



Fits by XLASS and MAGIX using data from CDMS and JPL
And from Müller, priv. comm.

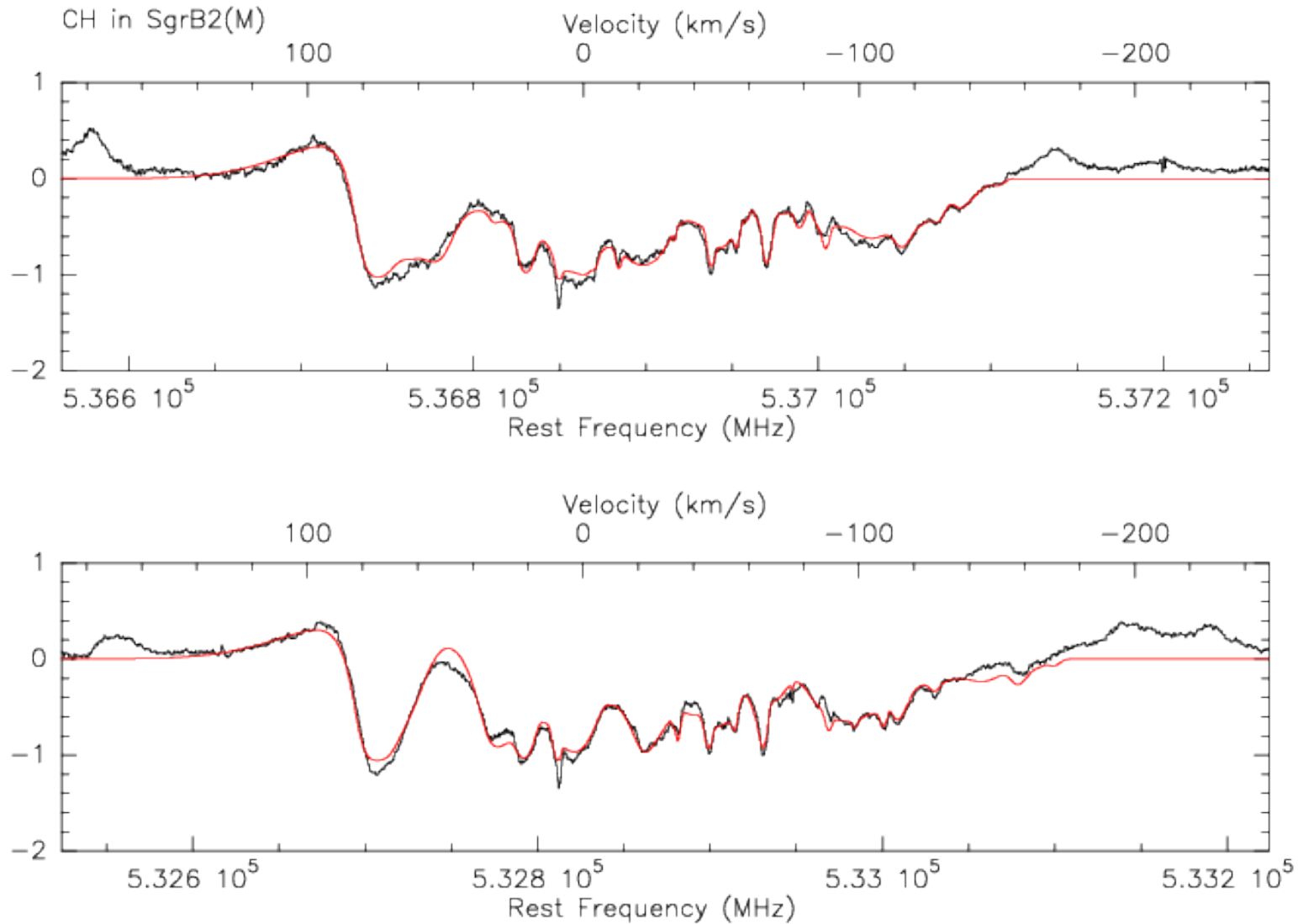


H₂O ortho/para ratio



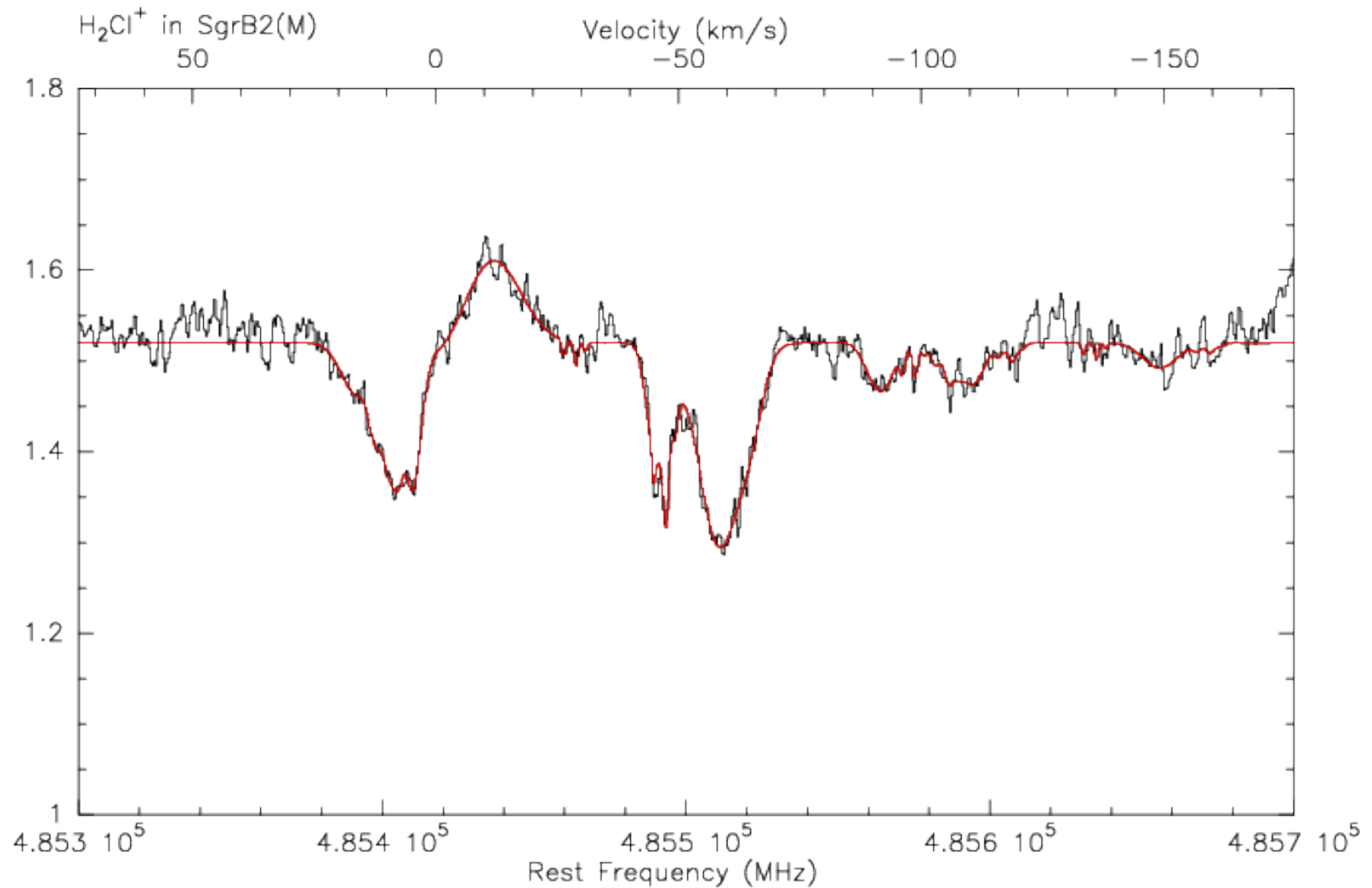
CH

Fits by XCLASS and MAGIX using data from CDMS and JPL
And from Müller, priv. comm.

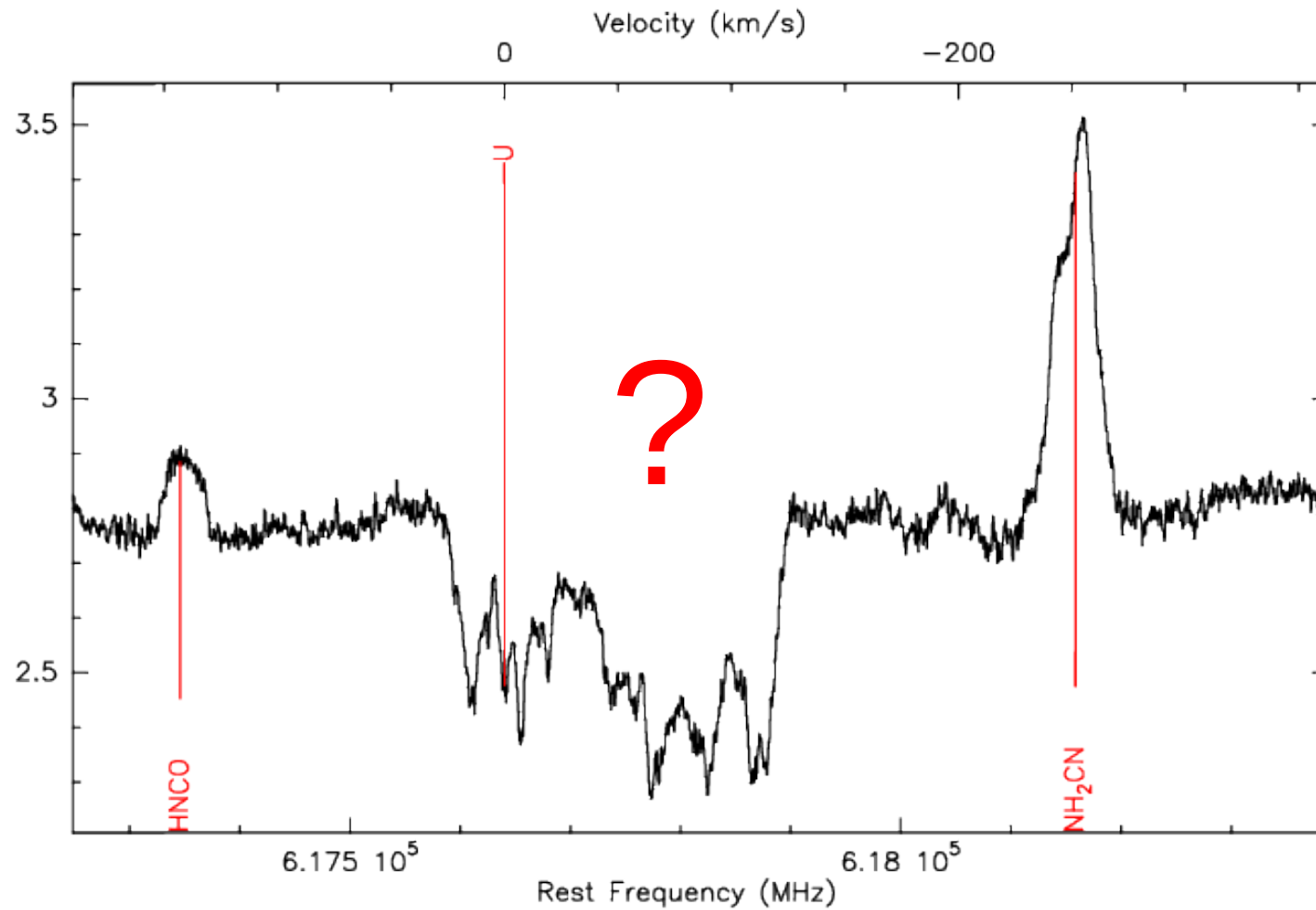




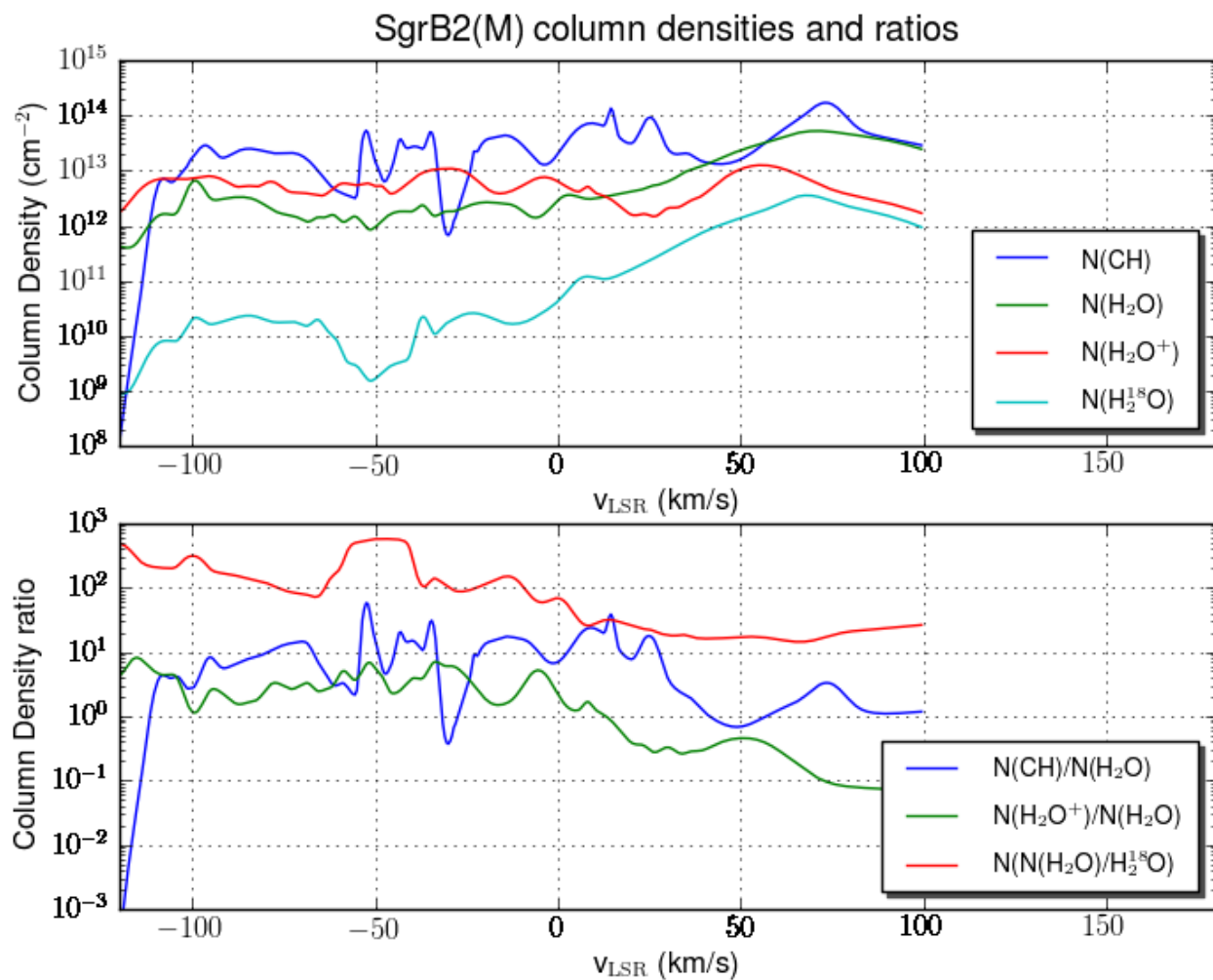
Fits by XCLASS and MAGIX using data from CDMS and JPL
And from Müller, priv. comm.



Unbiased surveys: Expect the unexpected!



Comparing column densities



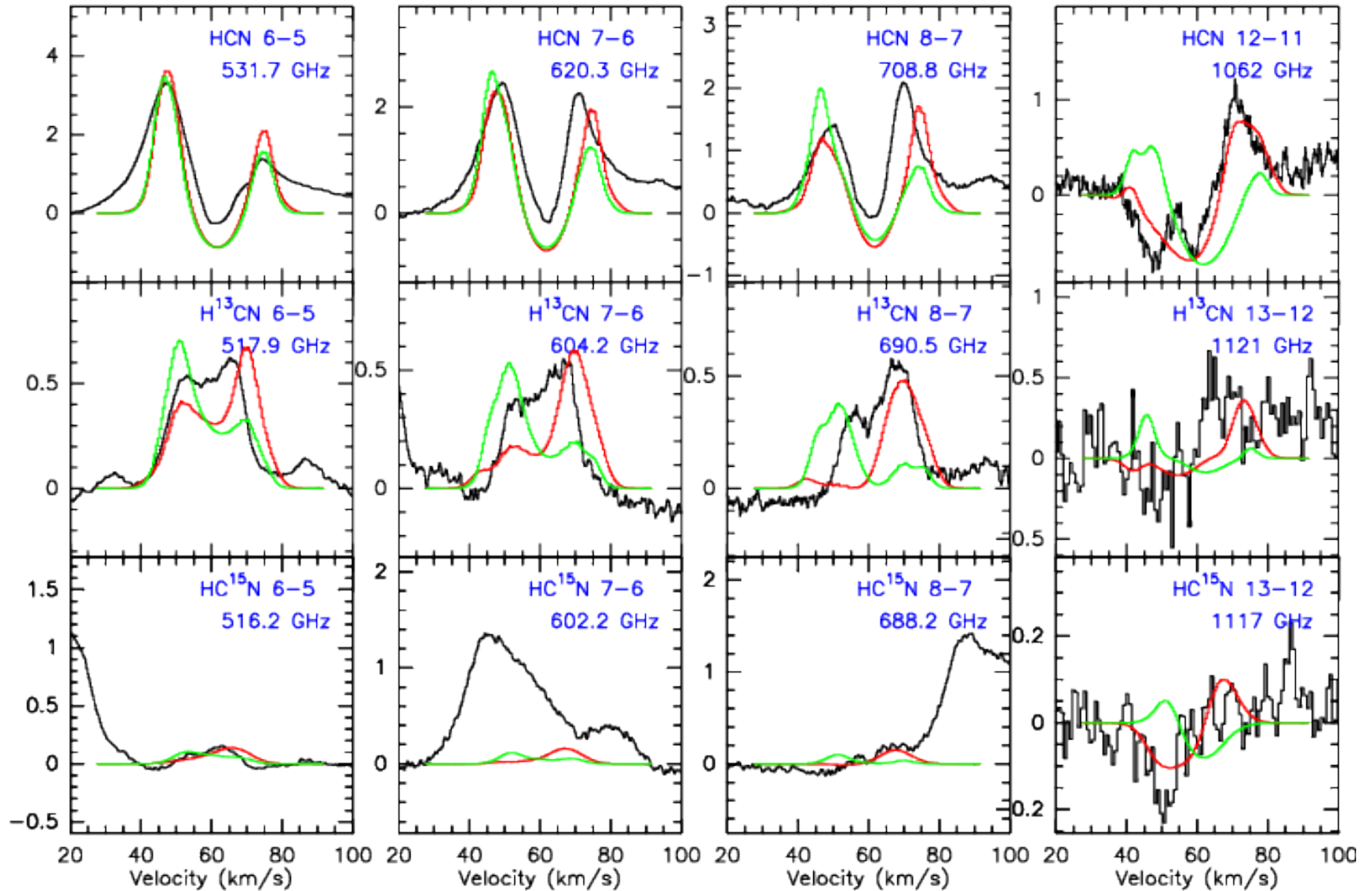
PRELIMINARY

Physical structure of core: HCN

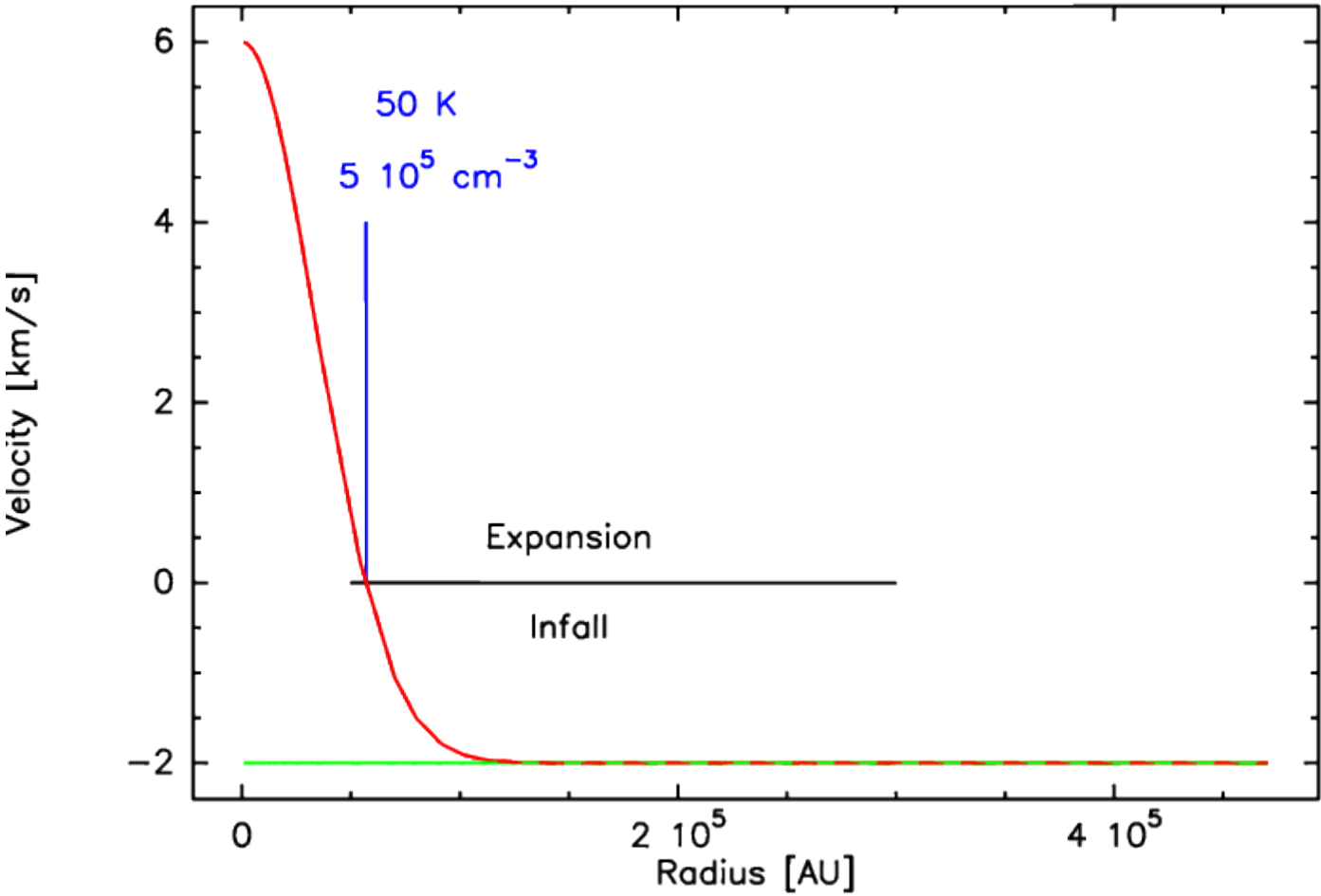
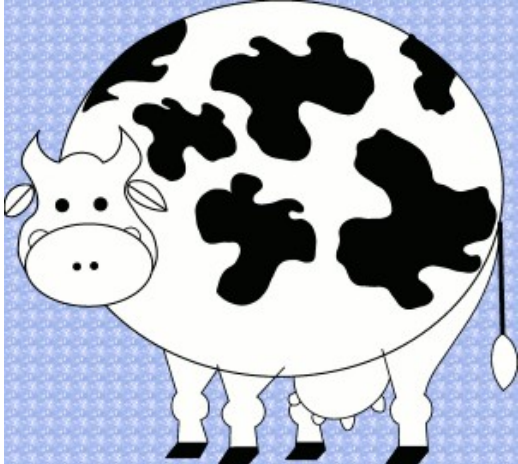
Green: Infall only

Red: Infall outside, expansion at center

HCN

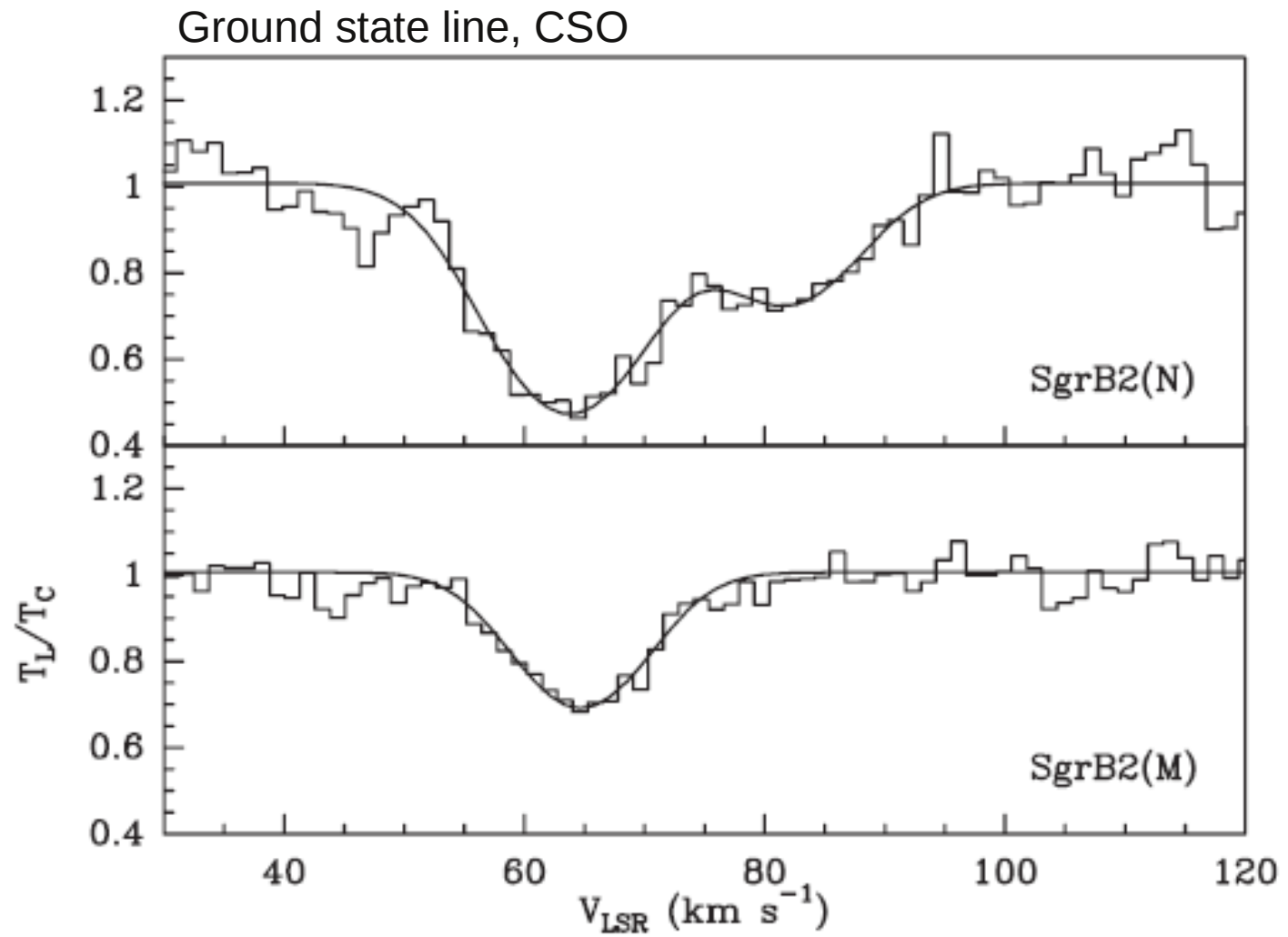


HCN



Chemical and physical structure:
few lines - HDO

HDO



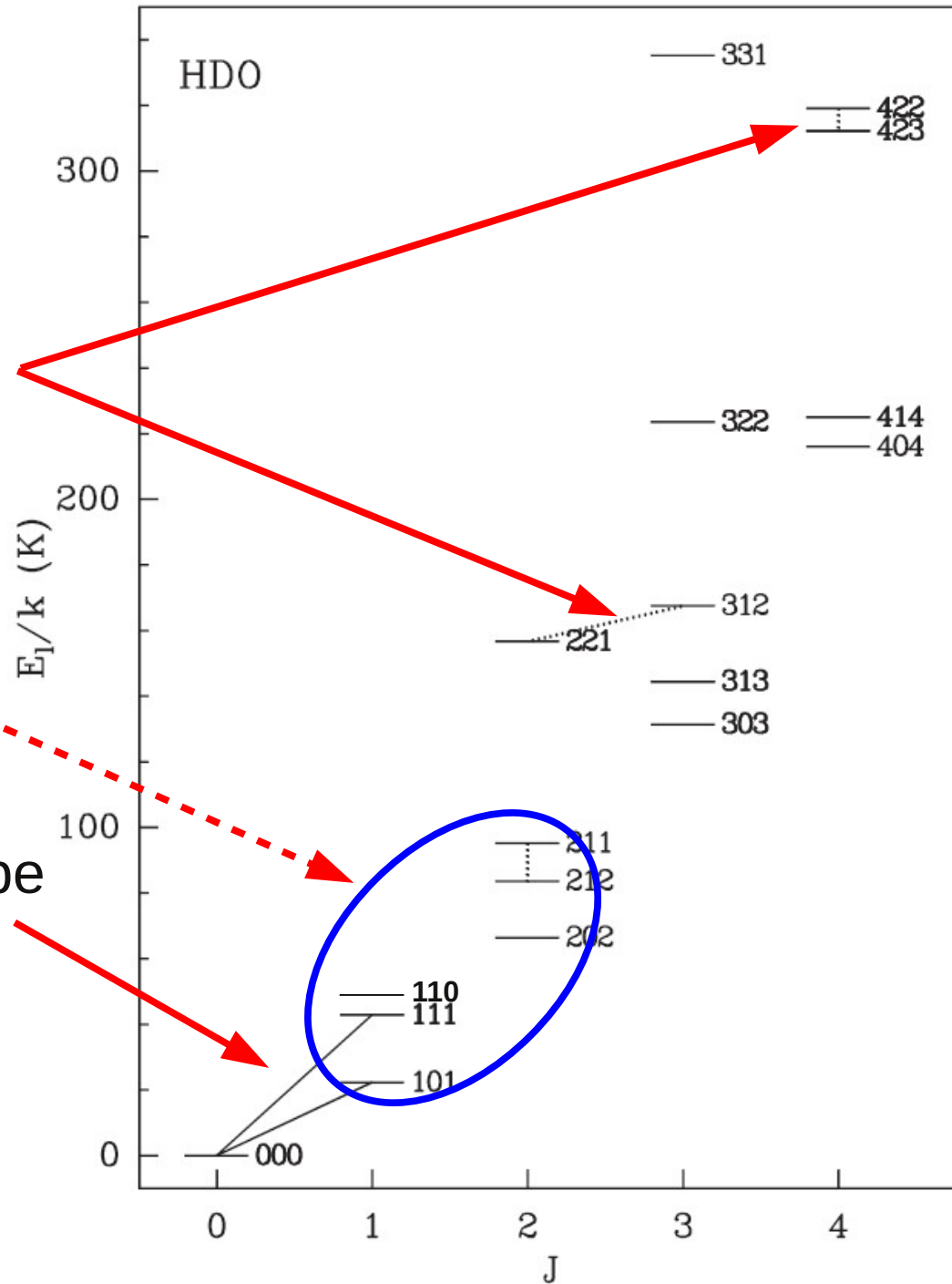
HDO levels

Tracing the inner core

Lines tracing
inner envelope/
outer core
(mostly) missing

Tracing the outer envelope

Lines used by
Comito et al. 2003

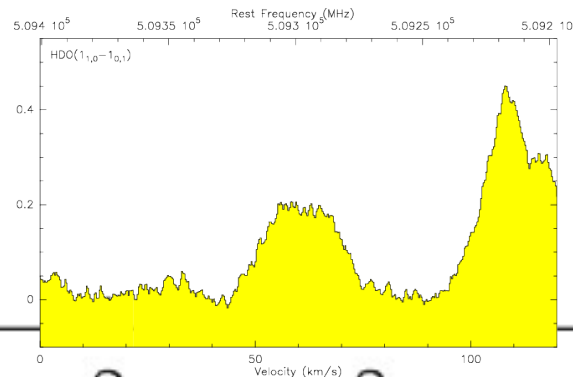
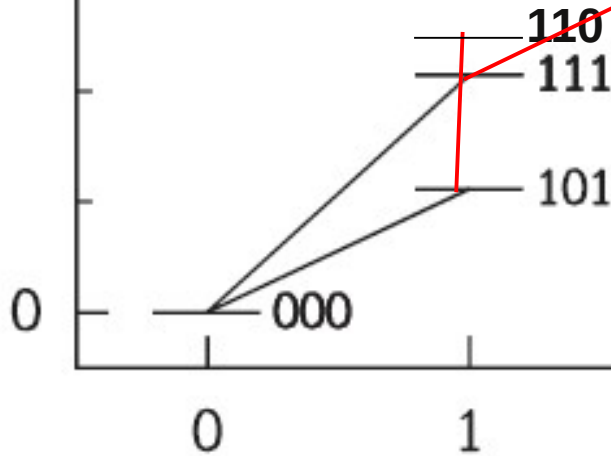
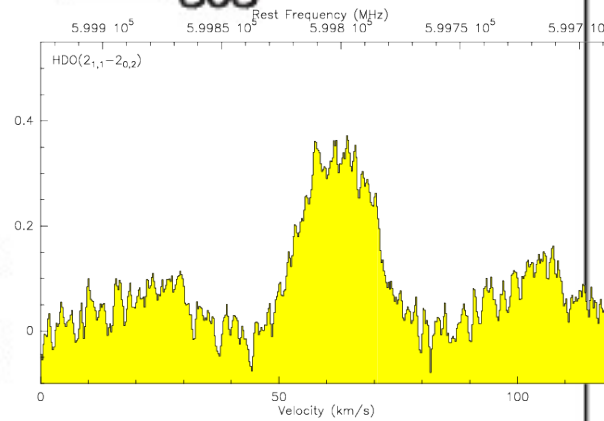
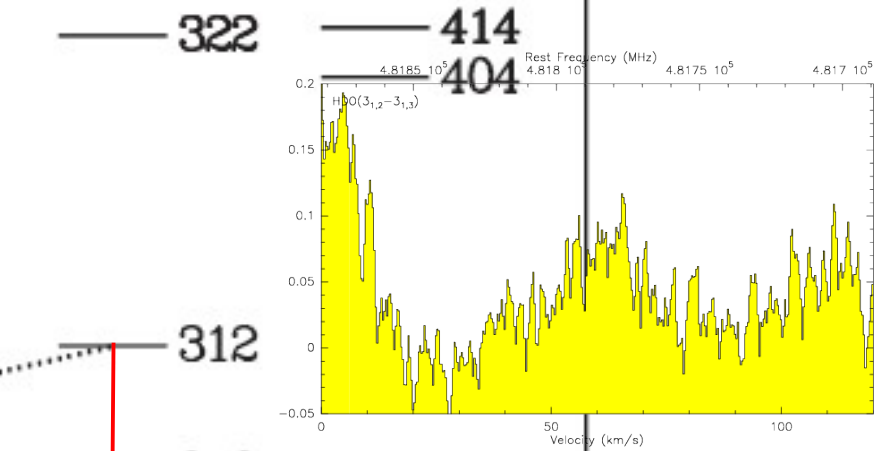
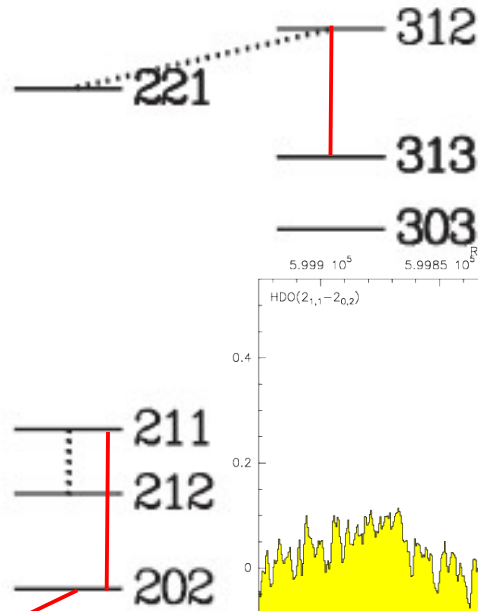
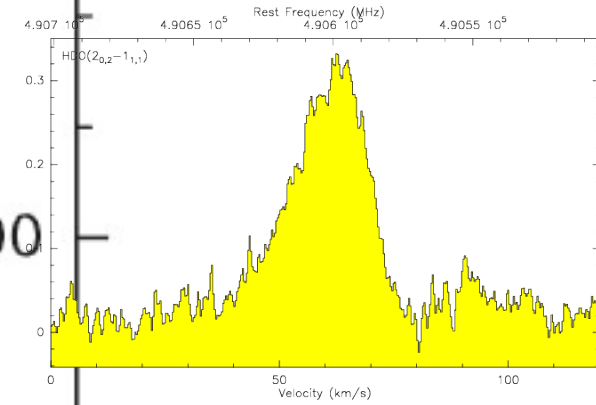


Lines so far...
More to come!

E_1/k (K)

200

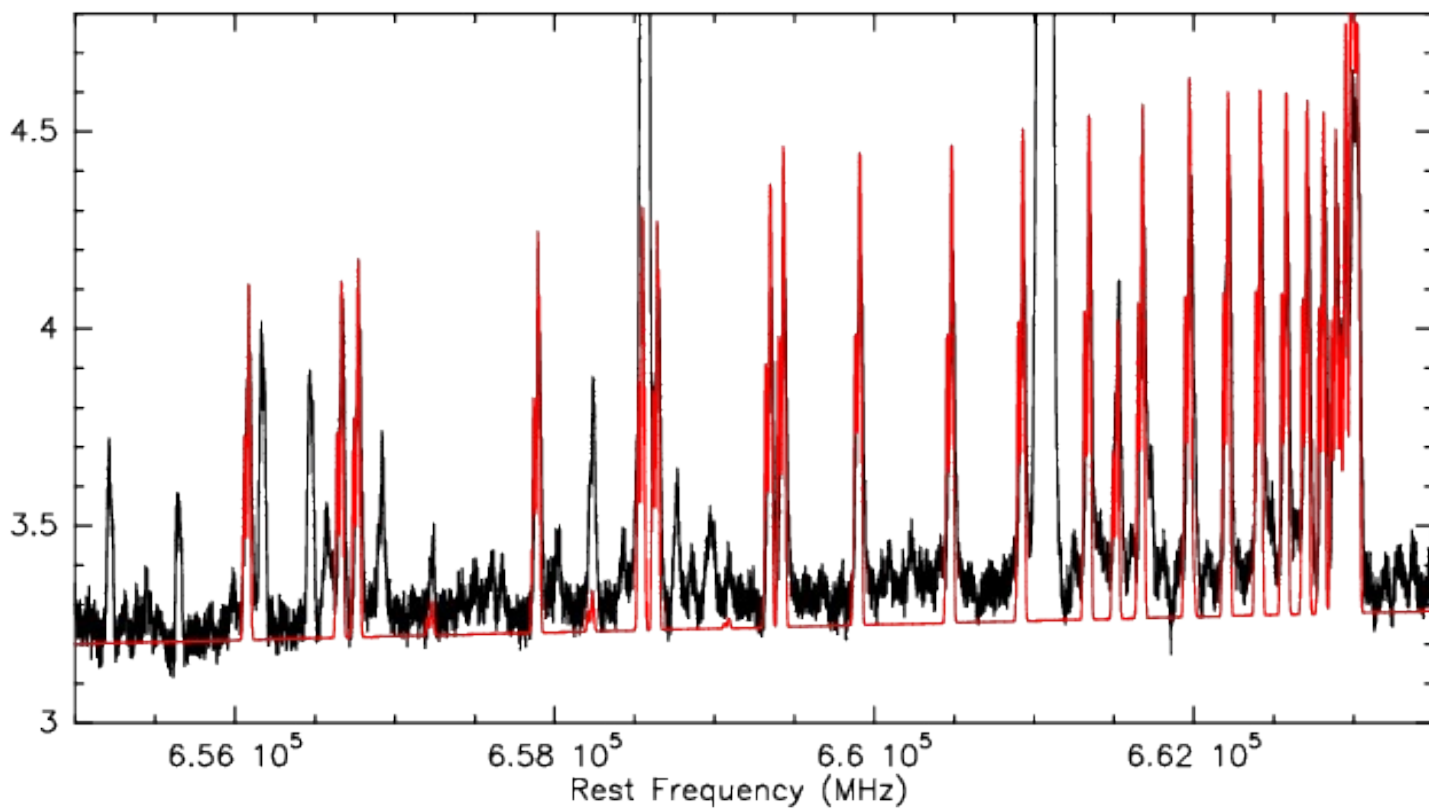
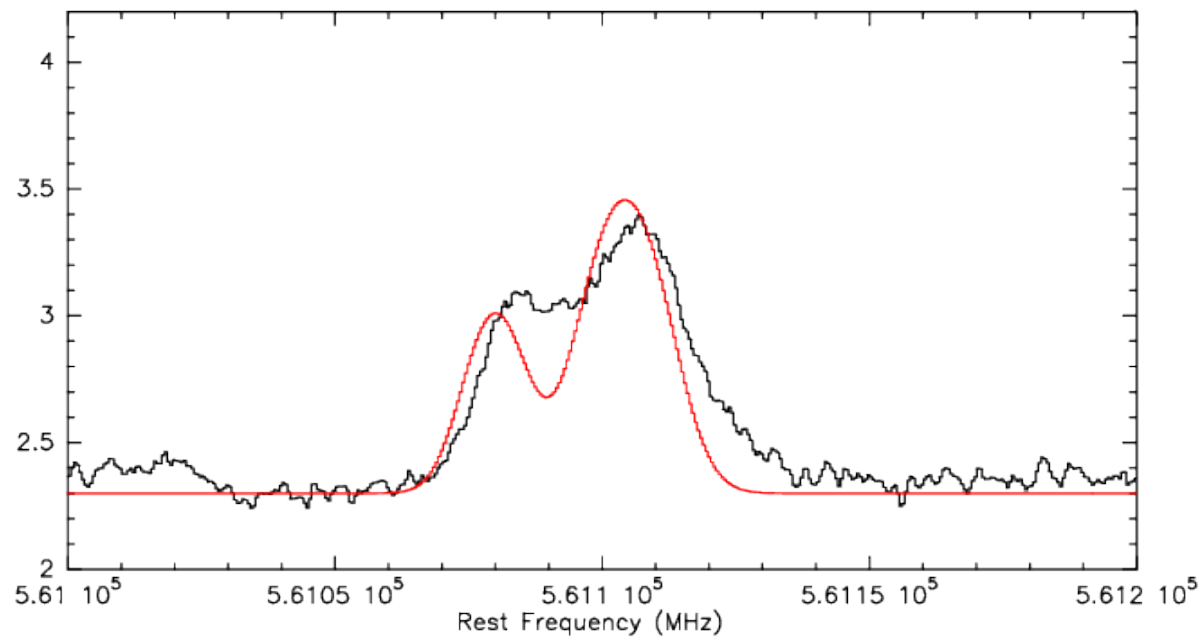
100



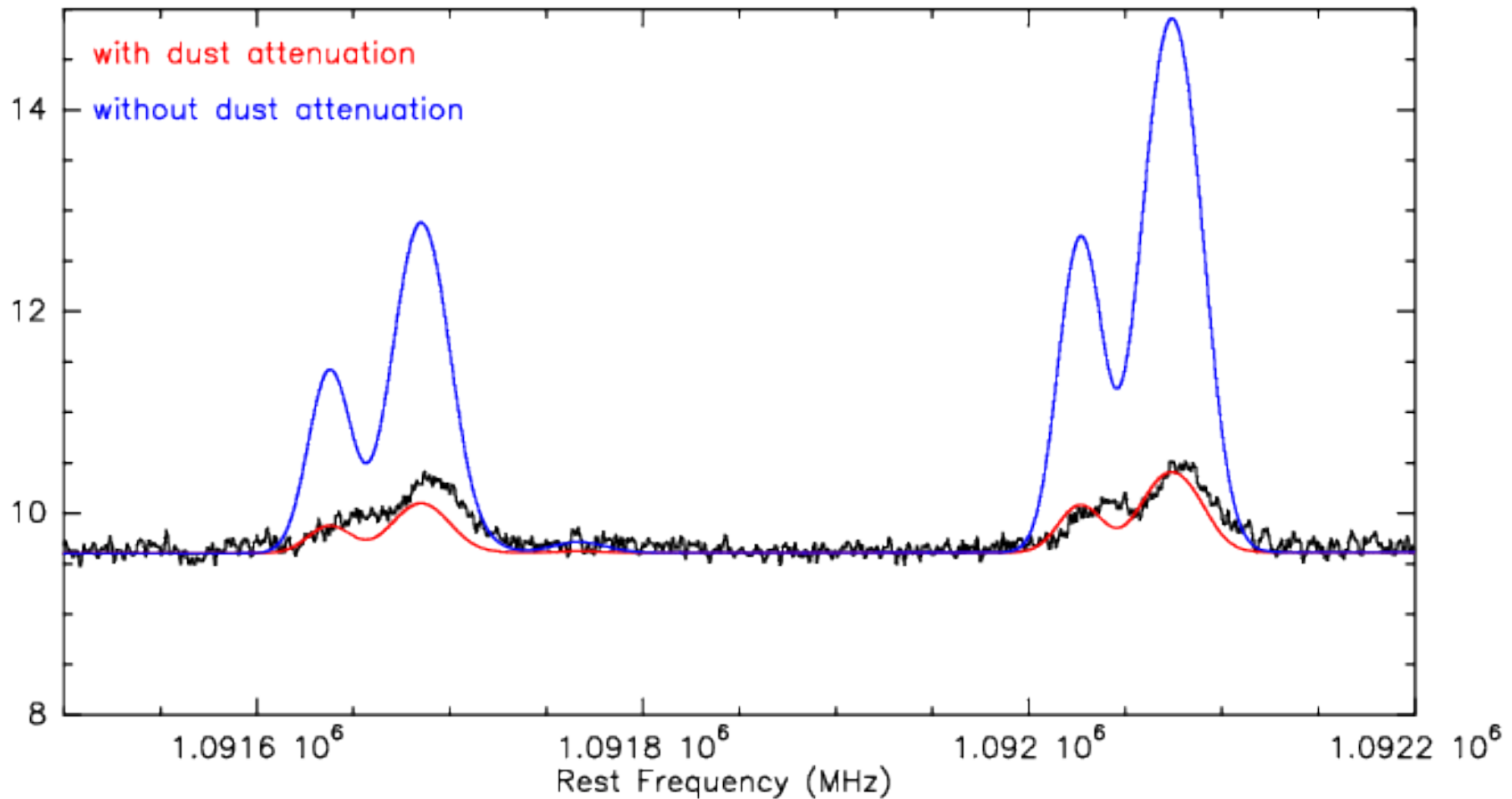
J

Chemical and physical structure:
many lines - SO₂

SO₂ fitting



SO₂ in Band 4: continuum shutting down lines



Outlook

- More bands in SgrB2(M)
 - Finalizing the molecular inventory
- SgrB2(N) complete survey
 - Similar weight class, in a different stage of evolution
- High-resolution ground based followups needed to interpret results
 - SMA
 - ALMA!