



6.7 GHz and 25 GHz methanol masers in OMC-1

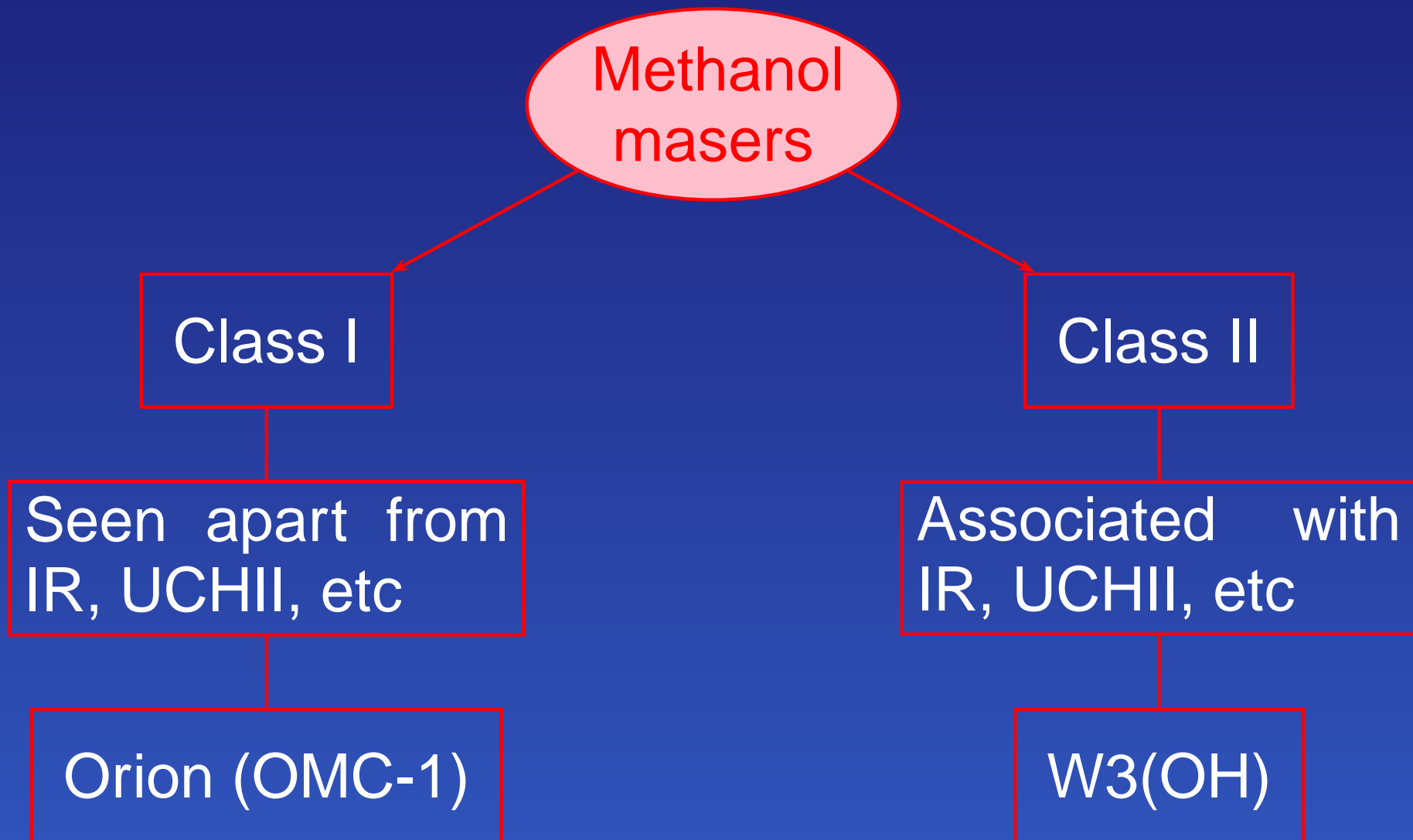
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in collaboration with

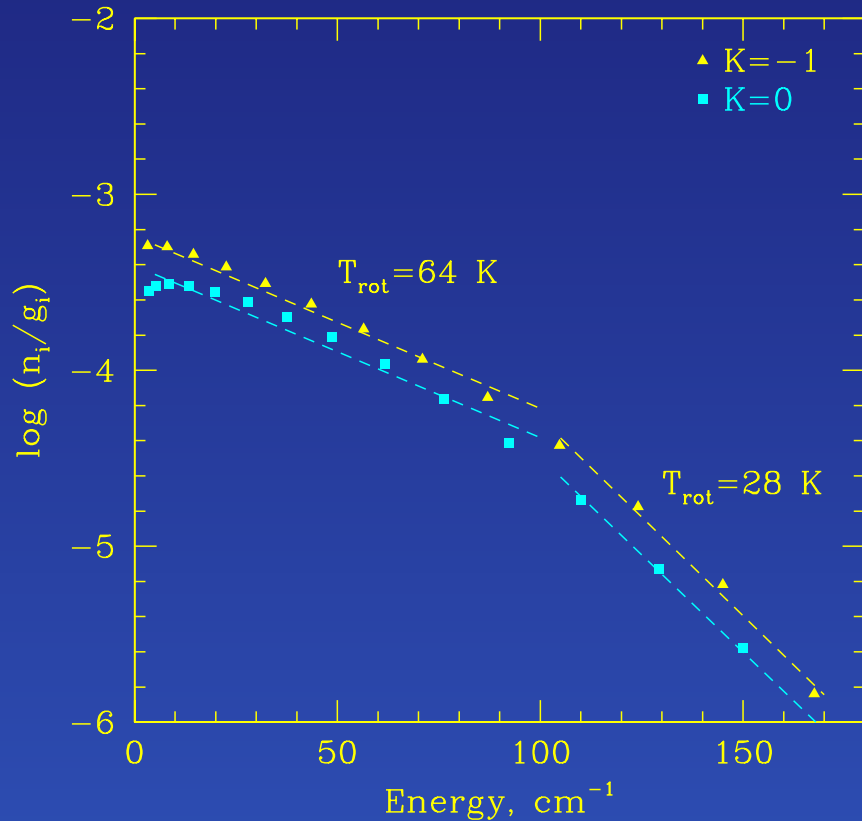
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Two classes of methanol masers



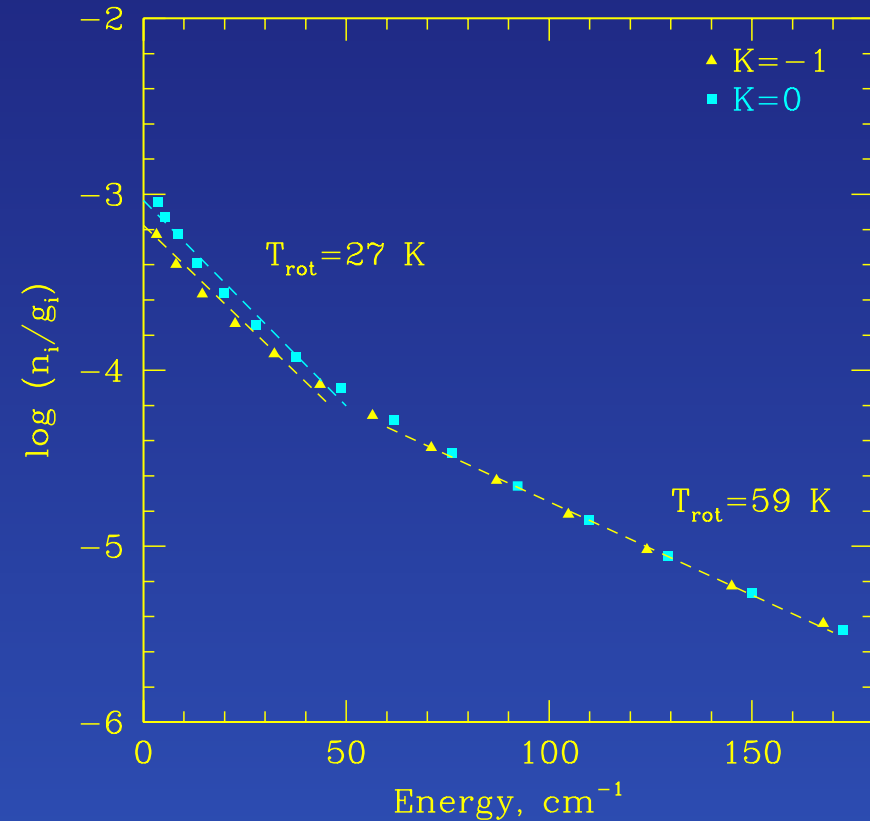
Two classes: pumping difference

$$T_{rad} = 2.7 \text{ K}, T_{kin} = 70 \text{ K}$$



Class I, e.g. $4_{-1} - 3_0 \text{ E}$
at 36 GHz

$$T_{rad} = 70 \text{ K}, T_{kin} = 20 \text{ K}$$



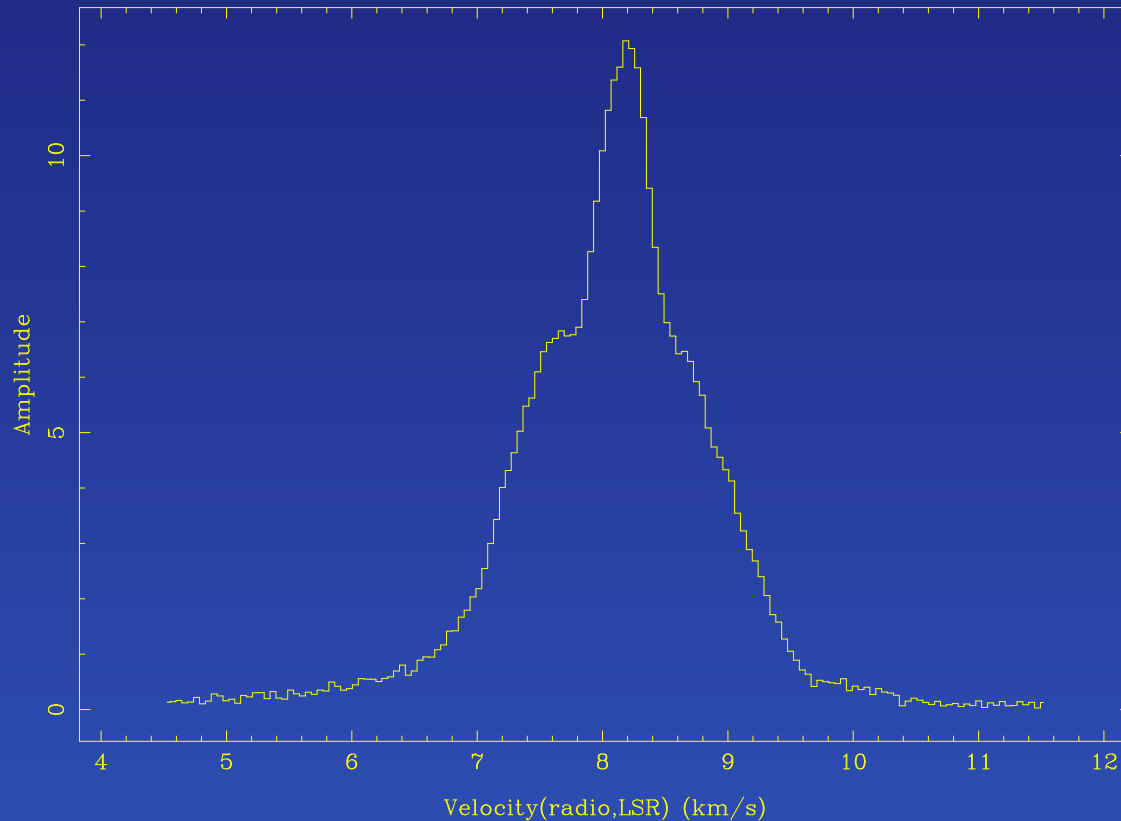
Class II, e.g. $2_0 - 3_{-1} \text{ E}$
at 12 GHz

Theory: they may coexist

- Masers of different classes are often seen in the same sources, but apart from each other. This is not an interesting case.
- Modern models of the methanol maser pumping predict a weak 6.7 GHz maser (Class II) under the same conditions when the 25 GHz transition (Class I) becomes a maser.
- The OMC-1 has the brightest known 25 GHz methanol maser. It is worth to search a 6.7 GHz emission in this source.

OMC-1: 25 GHz spectrum

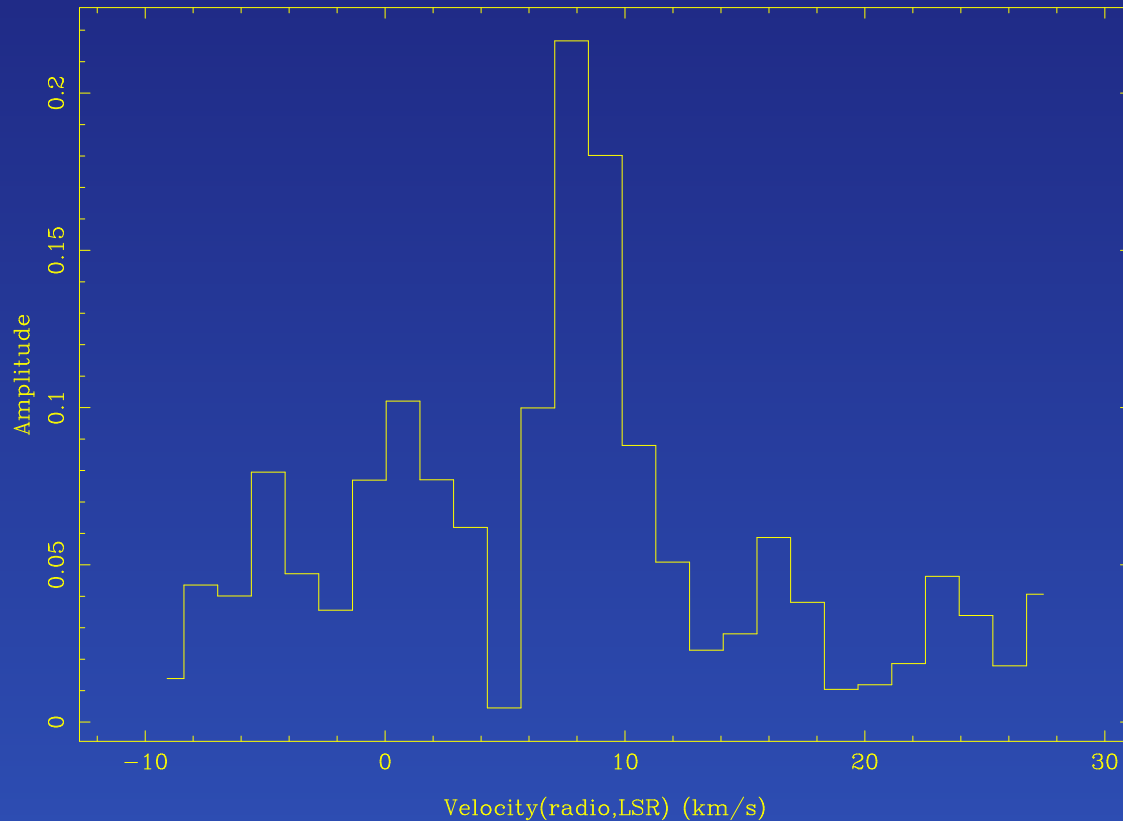
XX, $\tau=649.3$ min, T=02:33:08



The 25 GHz spectrum (observed the first time with the ATCA). All baselines have been averaged together.

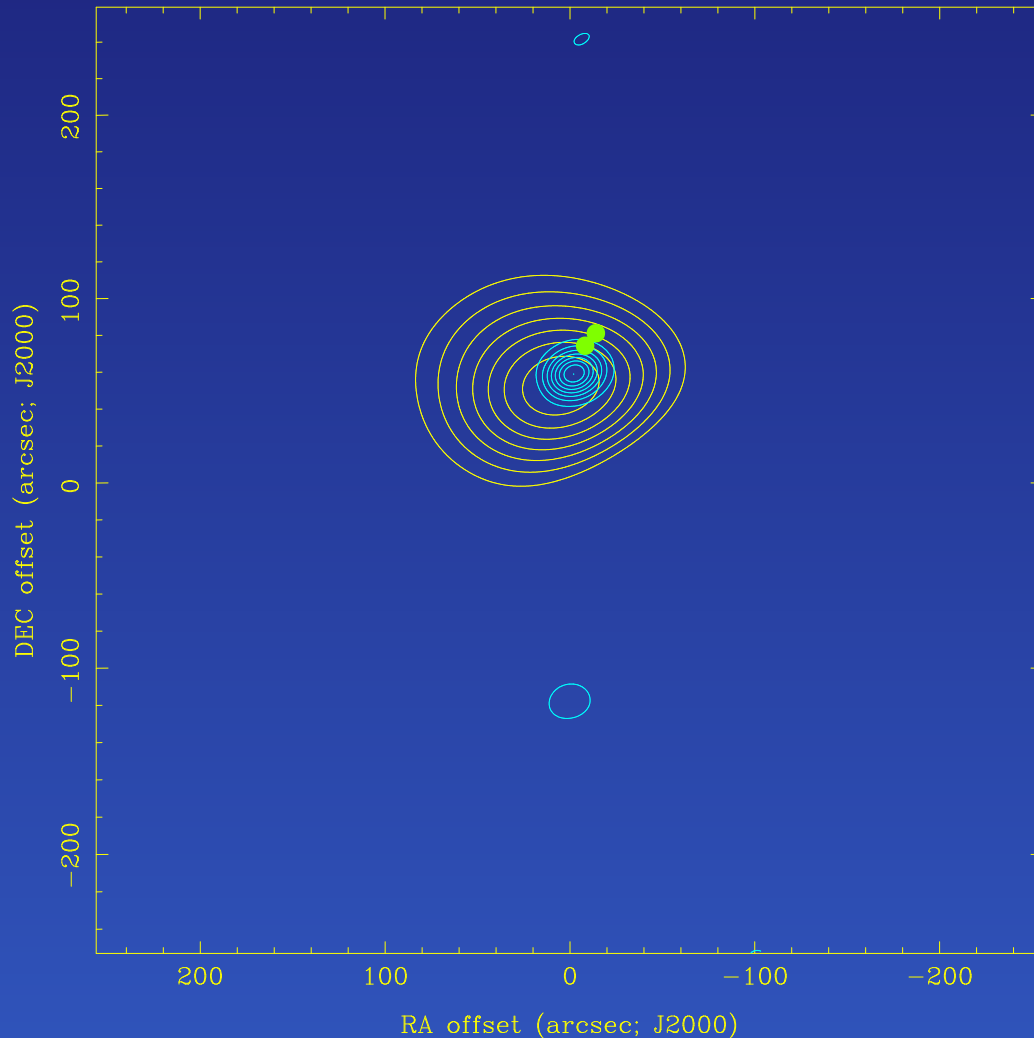
OMC-1: 6.7 GHz spectrum

XX, $\tau=3303.4$ min, T=02:44:50



The 6.7 GHz spectrum. All baselines have been averaged together.

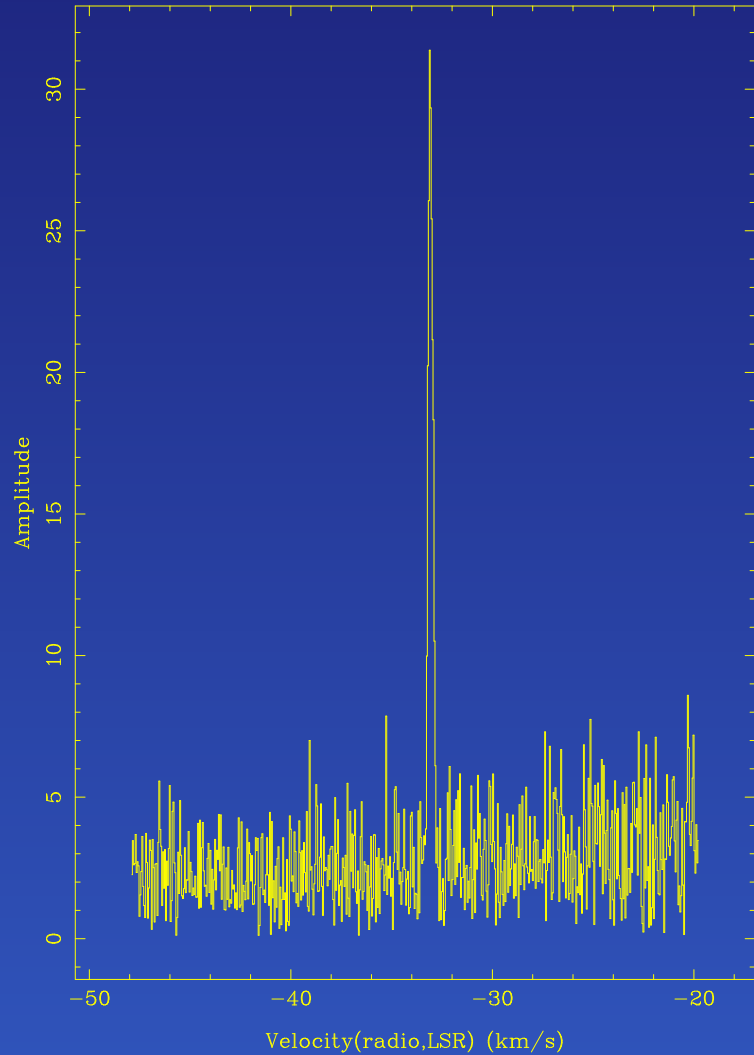
OMC-1: 6.7 GHz and 25 GHz



The 6.7 GHz emission may originate from the same place, where the 25 GHz maser spots were found.

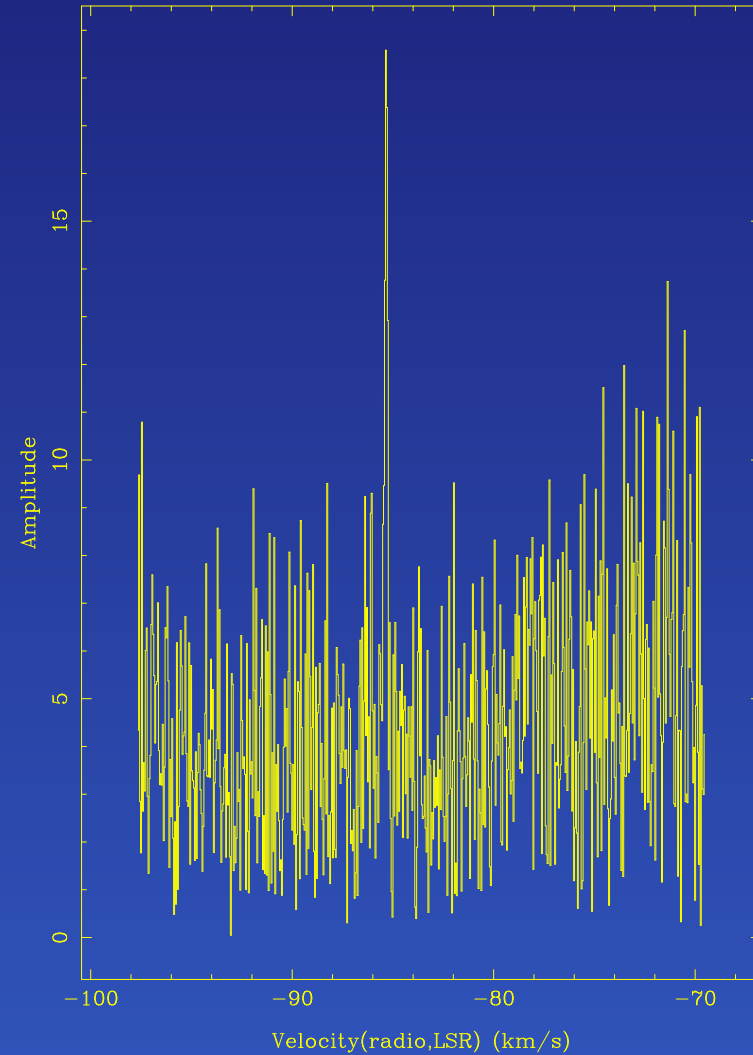
25 GHz: new detections

XX, $\tau=5.1$ min, Bl=1-2, T=20:40:25



305.36+0.2

XX, $\tau=5.0$ min, Bl=1-2, T=20:47:10



333.23-0.05

Conclusions

- A 6.7 GHz emission has been detected towards OMC-1.
- The 6.7 GHz emission may be associated with the 25 GHz maser spots.
- No line has been detected for long baselines in the recent observations although the line was seen in archival data with a similar integration time.
- New 25 GHz methanol masers were discovered in $305.36+0.2$ and $333.23-0.05$.