Triggered Star Formation in a Turbulent ISM
Proceedings IAU Symposium No. 237, 2006
B. G. Elmegreen & J. Palouš, eds.

doi:10.1017/S1743921307002839

CONDOR – A heterodyne receiver at 1.25-1.5 THz

M. C. Wiedner[1], G. Wieching[1], F. Bielau[1], M. Emprechtinger[1], U. U. Graf[1], C. E. Honingh[1], K. Jacobs[1], D. Paulussen[1], K. Rettenbacher[1] and N. H. Volgenau[1]

[1]I. Physikalisches Institut, Universität zu Köln, 50937 Köln, Germany

The **CO** $\mathbf{N^+}$ **D**euterium **O**bservations **R**eceiver (CONDOR) is a heterodyne receiver that operates between 1250–1530 GHz. Its primary goal is to observe star-forming regions in CO, N^+, and H_2D^+ emission.

The instrument follows the standard heterodyne design. It uses a solid state local oscillator (LO), whose signal is overlaid with that of the sky using a Martin-Puplett interferometer. The heart of the receiver is a superconducting NbTiN hot electron bolometer (HEB) (Muñoz *et al.* 2004). The bolometer has an area of 0.25×2.8 μm and is mounted on a SiN membrane in a waveguide mixer block. To facilitate operation at remote sites, CONDOR is the first receiver that cools the HEB with a closed-cycle system. Since HEBs are particularly sensitive to temperature fluctuations as well as modulations in LO power, we use a Pulse Tube Cooler, which has less vibration than, e.g., a Gifford-McMahon cooler. In order to further minimize vibrations and temperature fluctuations, the mixer and first amplifier are mounted on a separate plate connected via flexible heat straps to the 4 K stage. CONDOR has an intermediate frequency (IF) of about 1.0–1.8 GHz. We consistently obtain receiver noise temperatures below 1800 K and minima in the spectral Allan variances at 25–35 s (see Fig. 1), which is approximately the optimum individual on-source integration time.

In November 2005, CONDOR was successfully commissioned on the 12 m Atacama Pathfinder EXperiment (APEX) telescope. Pointing observations were performed on the Moon and Mars. The first spectral line observations were obtained of CO J=13-12 emission at 1497 GHz from several sources in Orion (Wiedner *et al.* 2006).

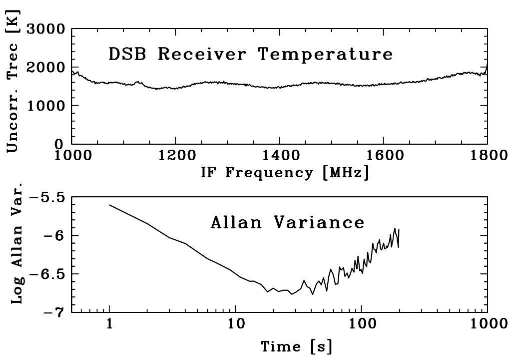

Fig. 1 Technical performance of CONDOR. *Upper panel:* DSB receiver noise temperature versus IF frequency. *Lower panel:* spectroscopic Allan variances.

Acknowledgements

This research is supported by the DFG within SFB 494.

References

Muñoz, P.P., Bedorf, S., Brandt, M., *et al.* 2004, *SPIE* 5498, 834
Wiedner, M.C., Wieching, G., Bielau, F., *et al.* 2006, *A&A* 454, L33