

# Functionalized MEMS vapor cells for chip-scale magnetometry

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MEMS atomic vapor cells have applications in miniature atomic sensors including chip-scale atomic clocks (CSACs) [1], atomic magnetometers [2] and atomic gyroscopes [3]. They consist of a microfabricated cavity sealed by transparent windows and containing an alkali metal and an optional buffer gas. Here, we review the recent developments at CSEM in term of design, fabrication, filling, sealing and functionalization of MEMS atomic vapor cells, with particular attention to the needs of optically-pumped magnetometers (OPM).

Recent works on lifetime assessment of cells coated with  $\text{Al}_2\text{O}_3$  and filled with the CSEM-patented method of  $\text{RbN}_3$  UV decomposition [4] will be presented [5]. Integrated functionalities (heating and temperature sensing) will also be described [6] as well as CSEM patent-pending gold microdiscs technology which enables the preferential condensation of rubidium droplets at defined locations inside the cell volume. A particular focus will then be given to the effect on thermal magnetic noise [7] for OPM applications.

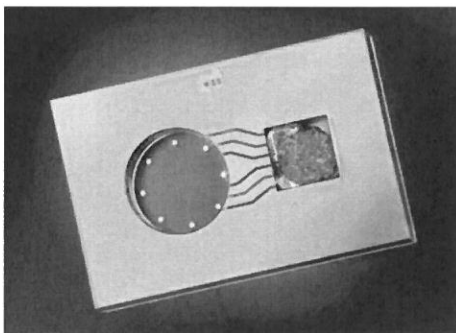


Figure 1: left: Cell filled by dispensing micropill and containing Au microdiscs - right: Cell filled by  $\text{RbN}_3$  UV decomposition with integrated functionalities.

## References

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