

# Noise and magnetic field detection of tunneling magnetoresistance sensors with perpendicular anisotropy

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Tunneling magnetoresistance sensors with perpendicular anisotropy (PA) are promising candidates for magnetic field sensing and detection because they offer high sensitivity [1] and control of sensing properties by the PA modulation [2]. The modulation can be realized by change in the sensing layer thickness and/or voltage-controlled magnetic anisotropy (VCMA) effect. We investigated the effect of PA on the noise and field detection in CoFeB/MgO/CoFeB sensors. We show that the higher the anisotropy the larger reduction of the noise in the sensors. However, the field detection improvement with the noise reduction is limited by the sensitivity drop. Consequently, there is a compromise between noise reduction and detectivity improvement in the sensors with perpendicular anisotropy modulation.

## References:

- [1] P. Wiśniowski, M. Dąbek, S. Cardoso, and P.P. Freitas, *Sensors Actuators Phys.* 202, 64 (2013)
- [2] P. Wisniowski, J. Wrona, T. Stobiecki, S. Cardoso, P.P. Freitas, *IEEE Transaction on Magnetics* (48) (2012) 3840

*This work was supported by the National Science Centre grant N505489040. We would like to thank Singulus Technologies AG for the wafers deposition.*