

Interactive comment on “Low-Noise Permalloy Ring-Cores for Fluxgate Magnetometers” by David M. Miles et al.

Anonymous Referee #1

Received and published: 18 June 2019

The authors present the production of 6-81 permalloy based low-noise ring-cores essential for high-quality, science-grade fluxgate instrumentation. This is very important work for the community since especially the North American market dramatically lacks manufactures for this type of magnetic sensing element due to the fact that Infinetics Inc. stopped the production in 1996. The paper is very well written, clearly understandable and an appropriate number of citations is included.

There are two general remarks:

1) The authors miss to mention the ring-core development activities in Europe. This fact gets especially obvious with the citation of Carr et al., 2005 as a potential use of Infinetics ring-cores. This is not correct. The outboard sensor was produced by Ultra Electronics (Kellock et al., 1996 and Carr et al., 2007) in the UK and the inboard sensor

C1

was developed by the Technical University in Braunschweig, Germany (Fornacon et al. 1999 and Auster et al. 2008). In addition, there has also been a very relevant ring-core production at the DTU in Kopenhagen (e.g. Nielsen et al., 1999).

Auster, H.U., Glassmeier, K.H., Magnes, W., Aydogar, O., Baumjohann, W., Constantinescu, D., Fischer, D., Fornacon, K.H., Georgescu, E., Harvey, P., Hillenmaier, O., Kroth, R., Ludlam, M., Narita, Y., Nakamura, R., Okrafka, K., Plaschke, F., Richter, I., Schwarzl, H., Stoll, B., Valavanoglou, A., Wiedemann, M., 2008. The THEMIS Fluxgate Magnetometer. *Space Sci Rev* 141, 235–264. <https://doi.org/10.1007/s11214-008-9365-9>

Carr et al., A Magnetometer For The Solar Orbiter Mission, The Second Solar Orbiter Workshop, 16-20 October 2006, Athens, Greece, ESA Publ. Div. (2007) https://www.researchgate.net/publication/41625175_A_Magnetometer_For_The_Solar_Orbi

Fornacon, K.-H., Auster, H.U., Georgescu, E., Baumjohann, W., Glassmeier, K.-H., Haerendel, G., Rustenbach, J., Dunlop, M., 1999. The magnetic field experiment on-board Equator-S and its scientific possibilities. *Annales Geophysicae* 17, 1521–1527. <https://doi.org/10.1007/s00585-999-1521-3>

Nielsen, O.V., Brauer, P., Primdahl, F., Risbo, T., Jørgensen, J.L., Boe, C., Deyerler, M., Bauereisen, S., 1997. A high-precision triaxial fluxgate sensor for space applications: layout and choice of materials. *Sensors and Actuators A: Physical* 59, 168–176. [https://doi.org/10.1016/S0924-4247\(97\)80169-0](https://doi.org/10.1016/S0924-4247(97)80169-0)

2) The authors primarily focus on the noise level of the ring-cores at 1 Hz and forget about the offset stability with ring-core temperature. This is a very important parameter for a “science grade” fluxgate instrumentation. This shortcoming should be discussed in Section 6 (Performance of the Ring-Cores) and/or Section 8 (Future Work).