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Magnetic detector based on giant magnetoimpedance and its application to vehicle detection — QING ZHANG¹, •HAIBIN GAO², ZHENJIE ZHAO¹, and UWE HARTMANN² — ¹Department of Physics, East China Normal University, 3663 Zhongshan North Road, 200062 Shanghai, P.R. China — ²Institute of Experimental Physics, Saarland University, D-66123 Saarbruecken, Germany

A field detector based on the giant magnetoimpedance (GMI) effect is developed. The GMI sensor is made of a $Co_{68.15}Fe_{4.35}Si_{12.5}B_{15}$ microwire with a diameter of $25\mu m$ and a length of $5mm$. A pick-up coil is around the microwire. The driving ac current through the wire induces an axial magnetization variation and thus a voltage in the pick-up coil. The field dependence of the second harmonics of this voltage is measured. The characteristics of the complete detector in terms of sensitivity, resolution, linearity, and temperature behavior were obtained under laboratory conditions. A $10pT$ magnetic field at a frequency of 40 Hz was detected. The output signal change is lower than $4 \times 10^{-4}/K$ in the working range of $-40^{\circ}C$ to $85^{\circ}C$. A first field test result on vehicle detection will be presented.

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